

PERSONAL COMPUTING

AT&T EXCLUSIVE

A Hayden Publication

July 1984 \$2.50 USA

AT&T's NEW Personal Computer

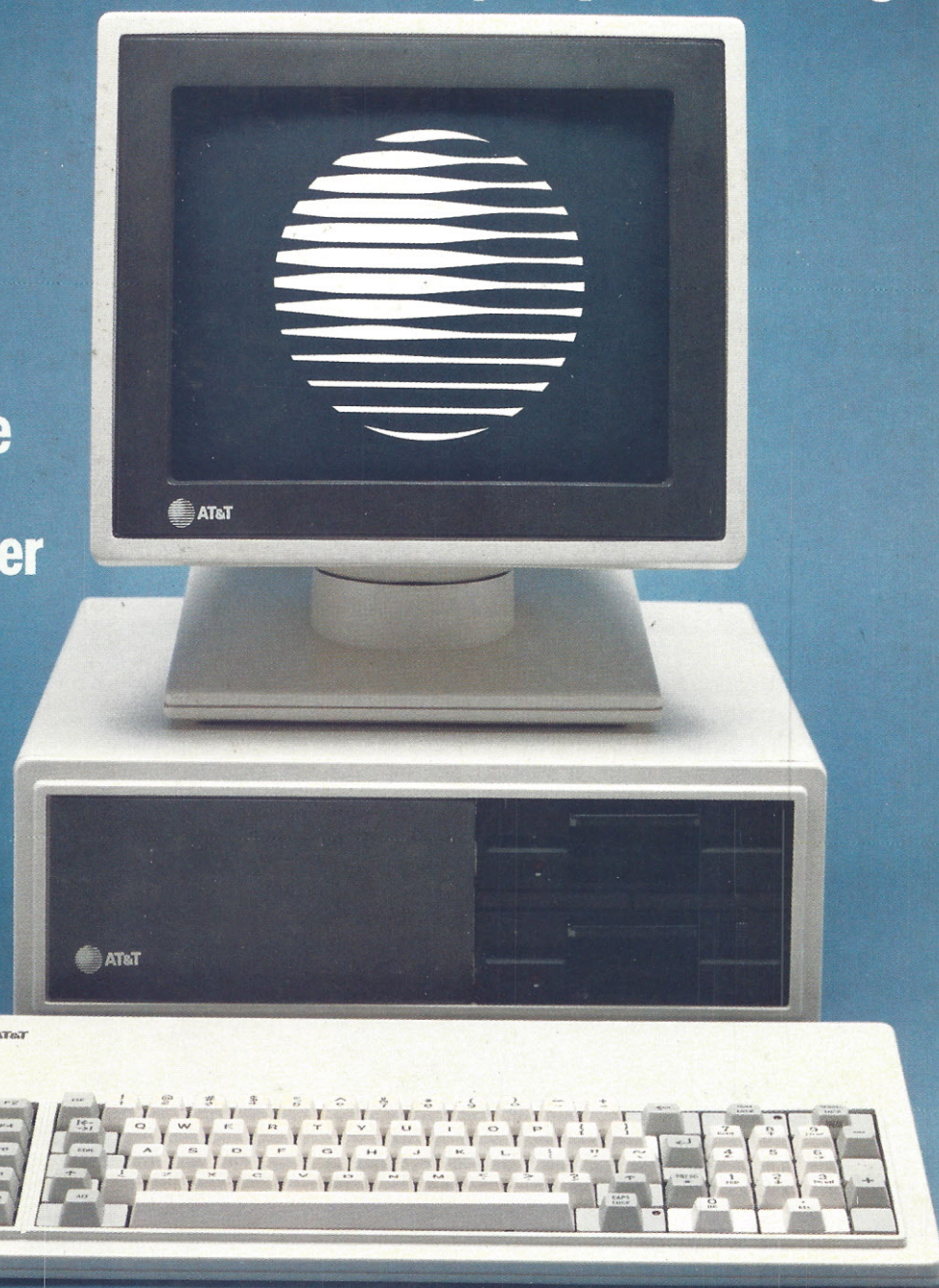
An Inside Look At The 'Phone Company's' Challenge

How Managers
Get The Computers
They Need

Spreadsheets—
Beyond Square One

Using Your Computer
To Watch
The Olympics

A Buyer's Guide To
Expansion Boards
For IBM
Compatibles



Canada & International \$3.50



Don't buy Omninet just because it's the #1 network.

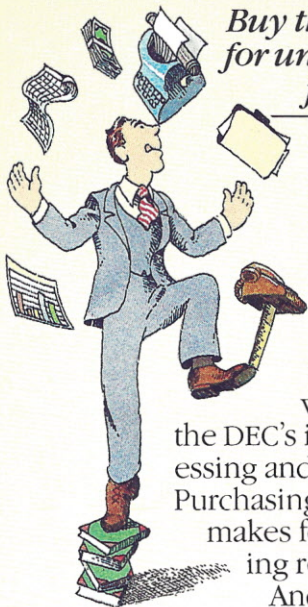
Buy it because it's the best buy.

At under \$500 per node, OMNINET has the lowest cost per station of any local area network.

Because an OMNINET Network uses simple, twisted pair wire. Which means that cabling costs one fifth of the coaxial alternatives, with none of the installation headaches.

Result? OMNINET is both easier and less expensive to install. Or expand.

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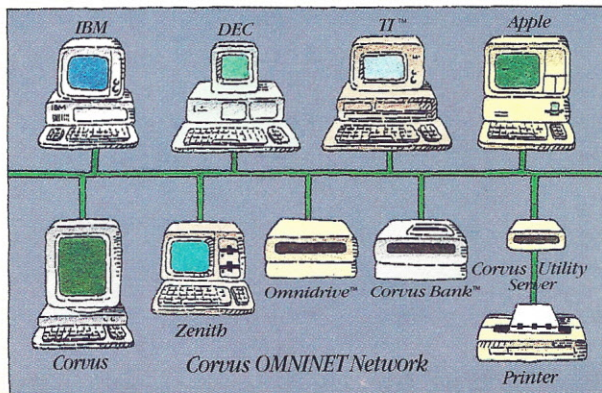


From Apples to Zeniths, OMNINET handles more types of micros than any other network. So keep

the DEC's in Data Processing and the PC's in Purchasing; OMNINET makes for great working relationships. And starting with

options like electronic mail, your people can choose from over 500 different programs according to their needs. Not their network's limitations.

What's more, CORVUS can handle all your hardware needs. From 6 to 45 MB hard disks through 200 MB Random Access backup at an amazing \$11 per megabyte. Both, with OMNINET servers built right in.



Buy the OMNINET Network for the most expandability.

If you're just starting a network, consider OMNISHARE™ Software. It lets your regular PC's or PC-compatibles make full use of the disk space on an IBM PC XT™.

When you want to draw on the resources of your central computer, you'll want Corvus' SNA Gateway. It lets your network's micros tap into your mainframe's information.

Whether you have 2 computers or 2,000, OMNINET can get the most out of them.

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We pioneered local area networking for micros. And we're constantly working on better ways to give you the system you need, with the versatility you want, at a price that makes sense.

With the result that 3 out of every 5 locally-networked micros in the world are connected to a CORVUS network.*

Give us a call at 800-4-CORVUS to find out more.

Because when it's all said and done, one of the best arguments for going with an OMNINET Network is really very simple.

Buy it for your peace of mind.

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It also has a new low price.

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Get the Apple juicer from Washington. Call 800-426-9400 (in Washington State call 206-828-8088) for the name of your nearest Microsoft dealer.

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July 1984

Volume 8 Number 7

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PERSONAL COMPUTING

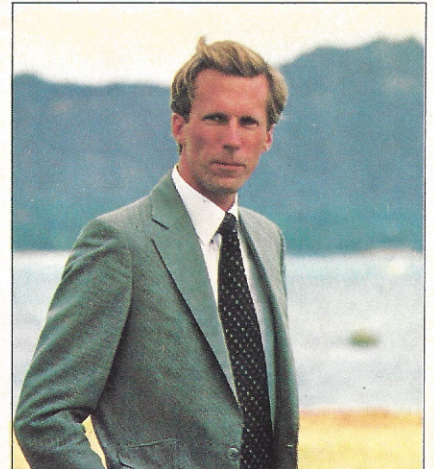
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COVER PHOTOGRAPHY BY AARON REZNY

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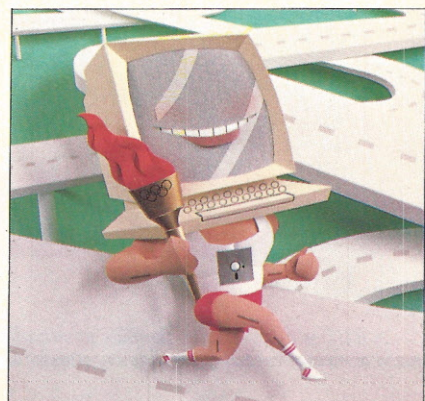
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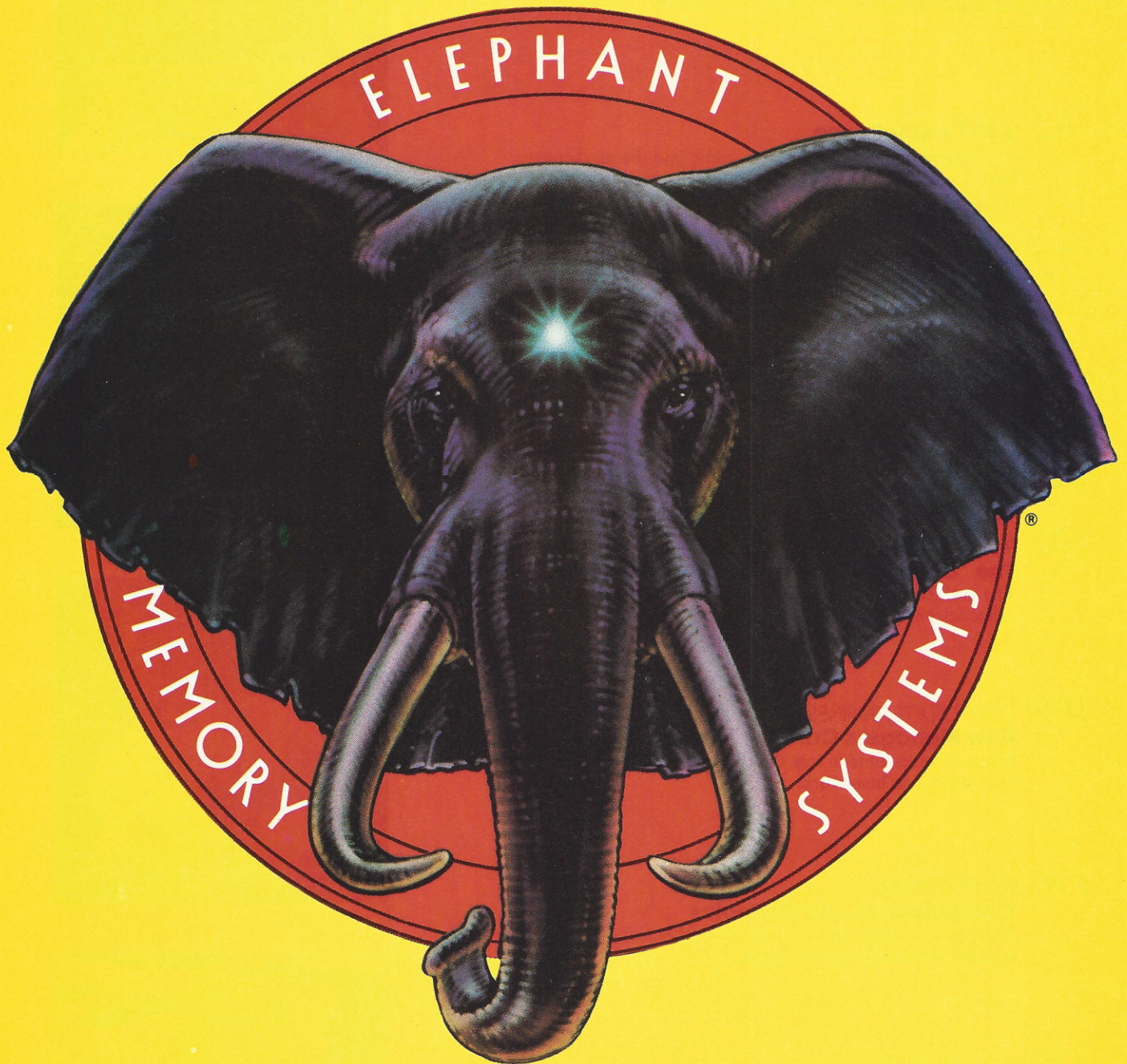
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CIRCLE 177



Announcing a small imp

It's 12" x 11¼" x 2¼".
It weighs less than 8 pounds.*
And costs less than \$1,300.*
Yet with 128K, the new Apple® IIc Personal Computer is a lot bigger than it looks.

The IIc has a full-size keyboard.



Because it's inherited all the talents of the eminently talented Apple IIe:

The versatility to run over 10,000 different software programs.

The ironclad reliability of the first true VLSI motherboard.

And the artistic ability of 16 high-resolution colors.

The IIc also has some talents of its very own.

For instance, a switchable 80/40-character display.

Switchable QWERTY/Dvorak keyboard.

A built-in half-high 143K single-sided disk drive.

Built-in serial ports for modems, printers and an extra half-high drive.

Even built-in mousetronics so it's ready to use a mouse and all the new Apple II mouseware.

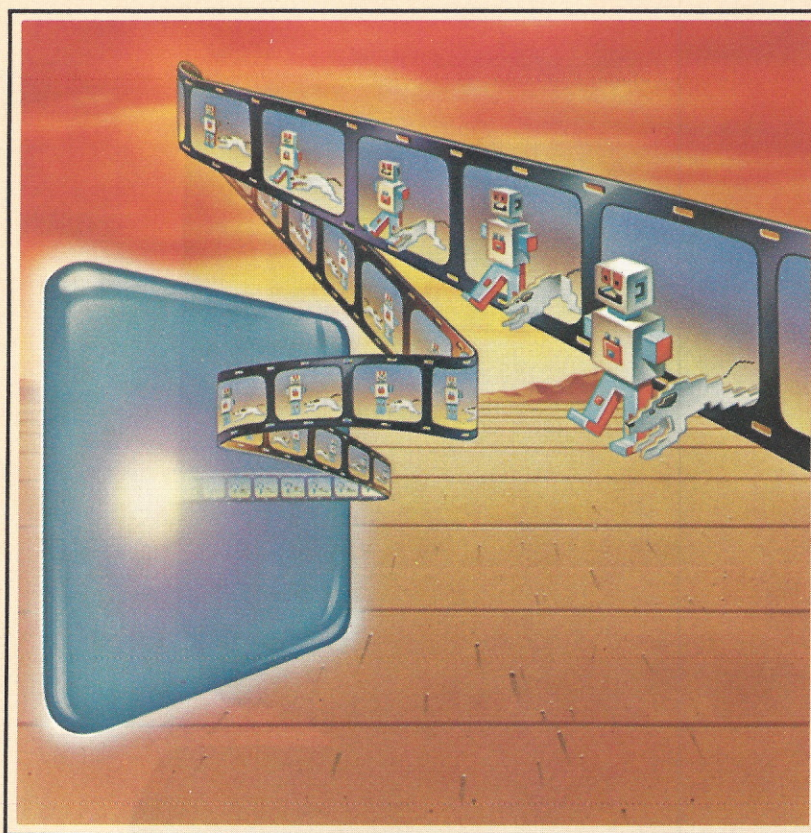
And our newest brainchild is certainly not an orphan.

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Thin, isn't it? Even with its built-in disk drive.



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 and a cast appears on the screen
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The
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Day



Middle of the
Road Lizard

Fast and restless.

The new Delta-15 printer kicks out AnyCalc, easy as 1,2,3!

In a 9 to 5 world full of changing spreadsheet data, you need a business printer that moves fast. A printer that constantly fires out printed information. A printer called Delta-15.

Delta has the ability to print multi-copy spreadsheets at an intense 160 cps. Its throughput never rests. In fact, it never even wavers in speed. That means that Delta constantly fits the most work into every single second.

Delta comes in a 10" or 15½" carriage size. It offers you the flexibility of standard 8K parallel and serial interface. And has the ability to underline, accept macro instruction, and print characters that range from full graphics to everyday printing to scientific notations.

Plus, as always, you get our unique 180 day warranty (90 days on print head).

So for everyone who needs their spreadsheet data "yesterday," this is as close as you can come! The new fast and restless Delta-15 business printer from Star.

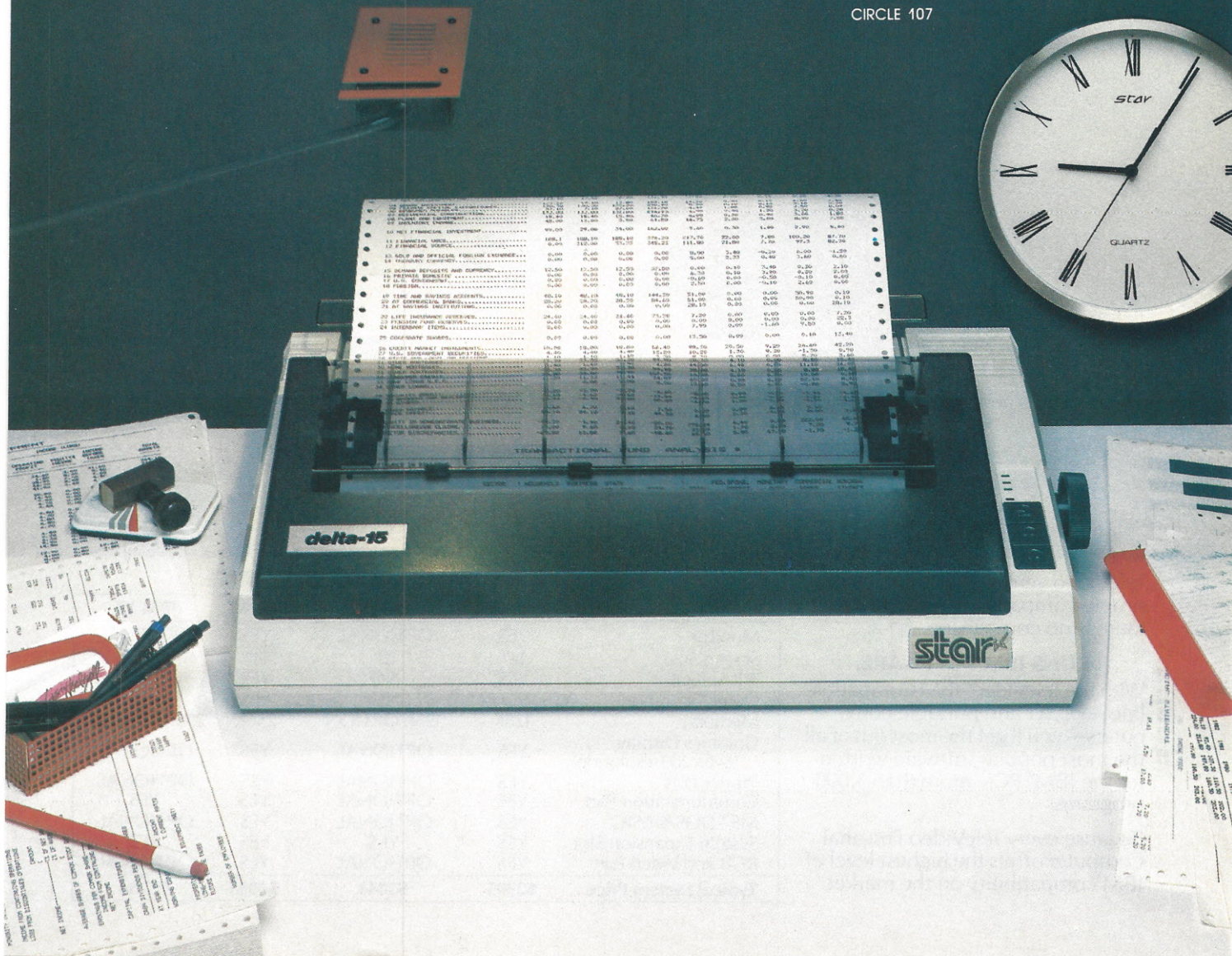
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CIRCLE 107



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Because every TeleVideo Personal Computer offers the highest level of IBM compatibility on the market

THE BEST HARDWARE FOR THE BEST PRICE.

Features	Tele-PC	IBM PC	Tele-XT	IBM XT
Monitor	YES	OPTIONAL	YES	OPTIONAL
Screen Size	14"	12"	14"	12"
Tilt Screen	YES	NO	YES	NO
Quiet Operation	YES (NO FAN)	NO	YES	NO
Memory	128K	128K OPTION	256K	256K OPTION
Graphics Display (640x200 resolution)	YES	OPTIONAL	YES	OPTIONAL
Printer Port	YES	OPTIONAL	YES	OPTIONAL
Communication Port	YES	OPTIONAL	YES	YES
MS™DOS/BASIC®	YES	OPTIONAL	YES	OPTIONAL
System Expansion Slot	YES	YES	YES	YES
RGB and Video Port	YES	OPTIONAL	YES	OPTIONAL
Typical System Price	\$2995	\$3843	\$4995	\$5754

compatibles. the best software.

and has the standard — not optional — features you need to take full advantage of every job your software can do.

Study the chart at the left. It proves that TeleVideo — not IBM — offers the best hardware for the best price.

Note that TeleVideo's ergonomic superiority over IBM extends from fully sculpted keys and a comfortable palm rest to a 14-inch, no glare screen that tilts at a touch.

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What is perhaps most impressive about the TeleVideo IBM PC Compatible can be found deep within its circuitry. We use the same 8088 central processing unit that runs an IBM PC. But we also employ new VLSI (Very Large Scale Integration) microchips that are designed and built exclusively for TeleVideo.

These interface more efficiently with the powerful 8088 and yield numerous benefits.

For example, our tiny custom chips do the work of many of the larger, more expensive circuit boards in an IBM PC. So we can offer a computer system that comes in one attractive, integrated case, is ready to run and occupies less desk space. A computer that edges out IBM's added-cost component system for reliability, ease of service and purchase simplicity.

Fewer circuit boards to cool also allowed us to eliminate the noisy, irritating fan IBM and most other PCs force you to put up with. And TeleVideo compatibles accept



THE BEST PORTABLE FOR THE BEST PRICE.

Features	TPC II	COMPAQ
High Capacity Storage	YES	NO
2nd Disk Drive	YES	OPTIONAL
Quiet Operation (No Fan)	YES	NO
Ergonomic Display	YES	NO
Communication Port	YES	OPTIONAL
International Power Supply	YES	NO
MS™-DOS 2.11	YES	NO
Graphics Display	YES	YES
Typical System Price	\$2995	\$3710

any IBM hardware options without modification.

THE BEST LINE.

But the Tele-PC is only one element of the TeleVideo IBM PC Compatible line.

The TeleVideo XT is the best hardware for users of popular IBM XT software who would appreciate an extra 10 megabytes of storage capacity along with the advantages listed on the preceding chart.

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HOW TO TEST DRIVE ACCOUNTING SOFTWARE.

Suppose you want to keep a good set of books on a computer. And you don't want to get stuck with a lemon of a software package. Then you're in the right ad. Especially if you're buying accounting software for the first time.



When so many software companies are fighting for your dollar, it can be hard to know which way to go. Here are some shopping techniques to point you in the right direction:

Demand a demonstration.

To make sure that the software you buy won't take you for a ride, ask your dealer for a demonstration. See if the software meets these performance criteria:

■ Does the accounting software offer comprehensive help functions? When you have a question, how will you find the answer? CHAMPION offers clear, concise on-screen help and useful book-keeping hints, throughout the program.

■ Does it have a recovery program? Some systems will lose all data in the event of a power surge or failure. But not CHAMPION.

Its unique recovery system goes to work putting your books back in balance immediately after a crash!

■ Does it provide real-time updating? You need your financial information to be current. CHAMPION's fully integrated system gives you the convenience of printing out financial statements immediately after changing or entering data. Very few accounting systems can do that!



High Performance

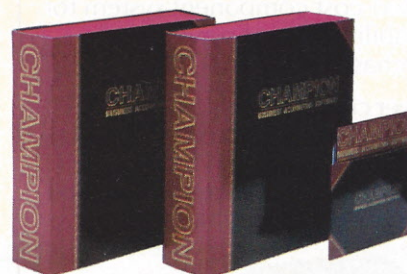
Take CHAMPION for a test drive, and you'll be impressed. It's engineered for easy operation. Even for first-time users. Built-in help functions displayed on the screen put you in the driver's seat. When you have questions, you'll be referred to the exact page in the owner's manual where you can find answers. Then, when you're cruising along, you can be certain that your books will never get out of balance. Whenever you enter a transaction, adjustments are made automatically to the entire system. Add these excellent handling characteristics

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Simplicity itself.

Or is it?

The plain fact is that the ease of operation the Epson offers today is accomplished with a degree of technological sophistication most other computers can only promise for tomorrow — specifically, fully integrated software, operating in an interactive environment.

The few other computers offering such "simplicity" cost \$5,000 to \$15,000 more. And most other computers can't offer it at any price. Which makes one wonder exactly what they do offer, in terms of either simplicity, or performance.

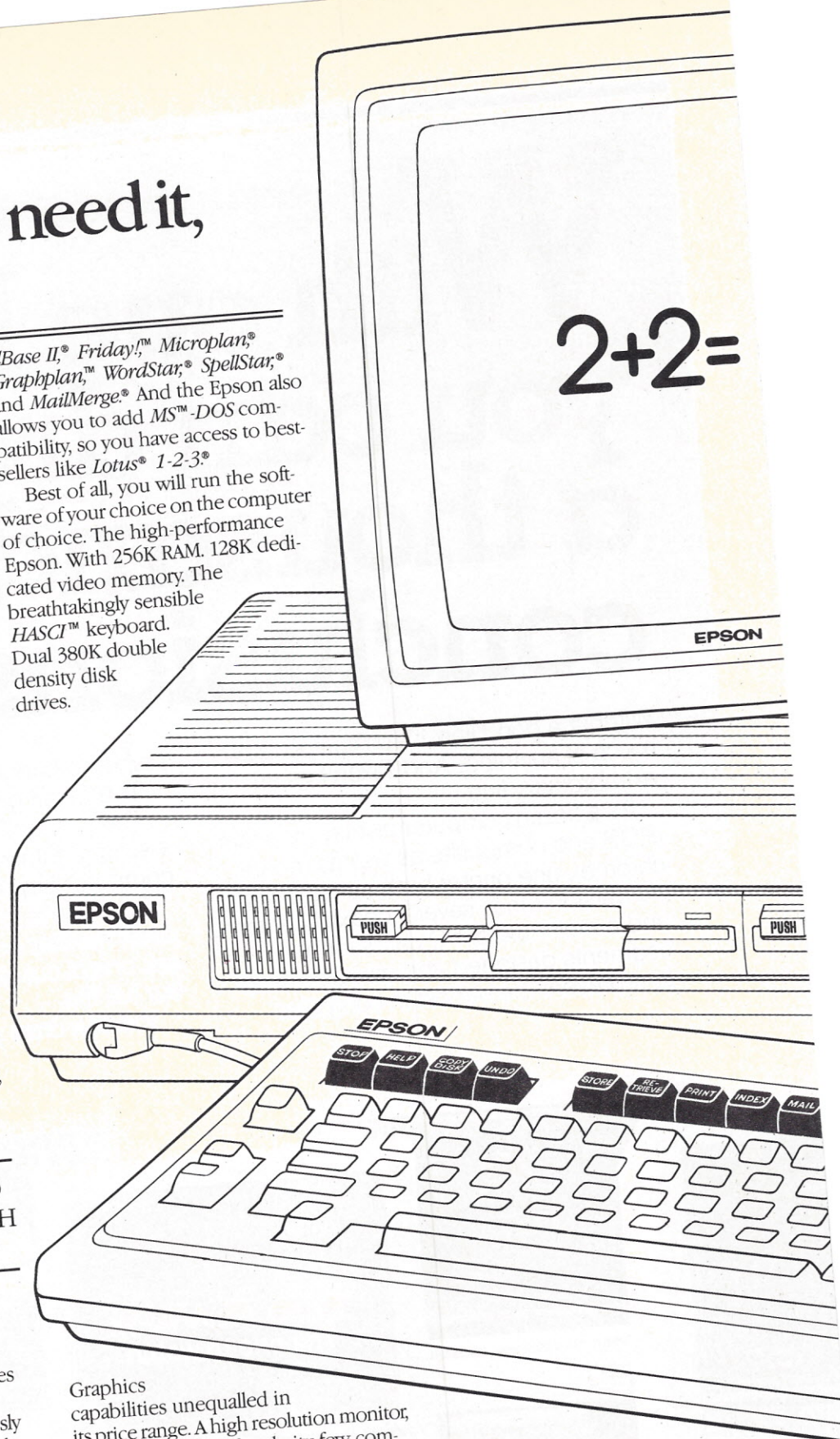
HOW MUCH CAN YOU DO ON THE EPSON? HOW MUCH ARE YOU READY TO DO?

The Epson's ease of operation may spoil you, but it certainly won't limit you.

Case in point: every Epson comes complete with an integrated software system — *Valdocs*® — to effortlessly provide the basic functions for which most people buy computers. The Epson also comes with *CP/M*® 80 2.2, so you can choose from the hundreds of programs in the *CP/M* library. And only Epson offers an exciting new collection of seven best-selling programs now specially enhanced to give you every powerful feature, plus Epson one-button simplicity. Included are

dBase II®, *Friday!*™, *Microplan*®, *Graphplan*™, *WordStar*®, *SpellStar*®, and *MailMerge*®. And the Epson also allows you to add *MS™-DOS* compatibility, so you have access to best-sellers like *Lotus*® 1-2-3®.

Best of all, you will run the software of your choice on the computer of choice. The high-performance Epson. With 256K RAM. 128K dedicated video memory. The breathtakingly sensible *HASC*™ keyboard. Dual 380K double density disk drives.



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Epson. For those who can handle it, performance.

puter companies ask you to pay extra for features like these. Most can not offer them at any price.

That, too, is performance. The kind of performance that can make choosing a personal computer very simple, indeed.

**EPSON QUALITY. OR, WHY
WONDER WHAT TERRIBLE
KLUDGES LURK IN WHICH
SLEEK BOXES.**

If you know computers, you know Epson. Epson printers set the industry standard for quality, reliability and value. Rest assured, the same can be said for the Epson personal computer.

The satisfying silence of the slim, Epson-designed disk drives is one way for you to judge or, for an inside-out perspective, here is an excerpt from a review by Jim Hanson in the April, 1983 issue of *Microcomputing**

"The Epson QX-10 is soundly designed and executed. I looked hard and found no evidence of kludging or shorting out anything in the name of economy. All the connectors have gold on them and are of quality manufacture. The printed circuit boards are heavy, with soldermarks on both sides of double-sided boards. The circuit boards are completely silk-screened with component labels, and the layout is as professional and clean as you will find anywhere."

Isn't this what you expect? After all, it's an Epson.

**A WORD TO THE WISE:
GET YOUR HANDS ON
THE EPSON.**

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For technical specifications, and the complete, 3-part *Microcomputing* review, along with the name of your nearby Epson dealer, call toll-free (800) 421-5426. California residents, call (213) 539-9140.

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CIRCLE 72



Productivity Is Key To New Offerings

■ **ITT XTRA** ■ **Microsoft Chart** ■ **Mindset**
■ **R:base Clout** ■ **Decision Manager**

ITT'S XTRA BECOMES A NEW COMPONENT IN THE OFFICE OF THE FUTURE

by Jim Keogh, Associate Editor

ITT has entered the personal computer market with a product that company officials claim is the first in a family of products that will embody the two key elements of the office of the future: the telephone and the personal computer. The new computer, called the ITT XTRA, is ITT's version of the merging of voice and data technologies in a desktop package the company claims is IBM Personal Computer-compatible.

"We believe these two basic office tools—the telephone and the personal computer—will merge into a single system integrating voice and data communications into one interrelated and interdependent function," says Jack Guilfoyle, ITT executive vice-president and president of ITT Telecommunications Corporation.

Because this 16-bit computer is "industry-compatible," it should run most of the currently available IBM Personal Computer and MS-DOS software. This is novel for ITT but certainly not an innovation from an industry-wide perspective.

"ITT has designed the ITT XTRA personal computer with a high level of operational compatibility and the capability to use the largest base of industry-standard software," says Thomas N. Payne, president of ITT Information Systems. "We believe the ITT XTRA personal computer meets the market needs better than any comparable personal computer because we are committed to both the hardware and software business."

ITT is offering four specially configured software packages under its own label: Multiplan, WordStar, VisuAll and EasyWriter I Word Processing System are all part of the ITT Software Library. These packages focus on personal productivity tools that help the business user to work smarter, faster and more productively, the company says. It has even coined a slogan that encompasses its entire introduction, "Work Smart America, With ITT."



The ITT XTRA is the first of a family of ITT products. It comes with ITT DOS 2.11 and an Intel 8088 16-bit microprocessor.

All of these software packages are available for the hard disk, but will not be bundled with the XTRA. The company promises to keep its library of software growing. Even if it doesn't, the system should be able to run an ample amount of software designed for the IBM Personal Computer.

In our test, such IBM Personal Computer software as VisiCalc, dBASE II, PFS:WRITE, PFS:GRAPH, PIE:Writer and PIE:Writer Speller were successfully booted on the XTRA. Most of them operated without any



The keyboard follows a standard typewriter layout and comes with 10 programmable keys and a numeric keypad.

problems; however, the test machine contained a single floppy-based system and a single hard disk drive (which is not a standard configuration). Thus, many programs we might have liked to test, ResQ for instance, needed two floppy disk drives or could not be loaded on a hard disk system.

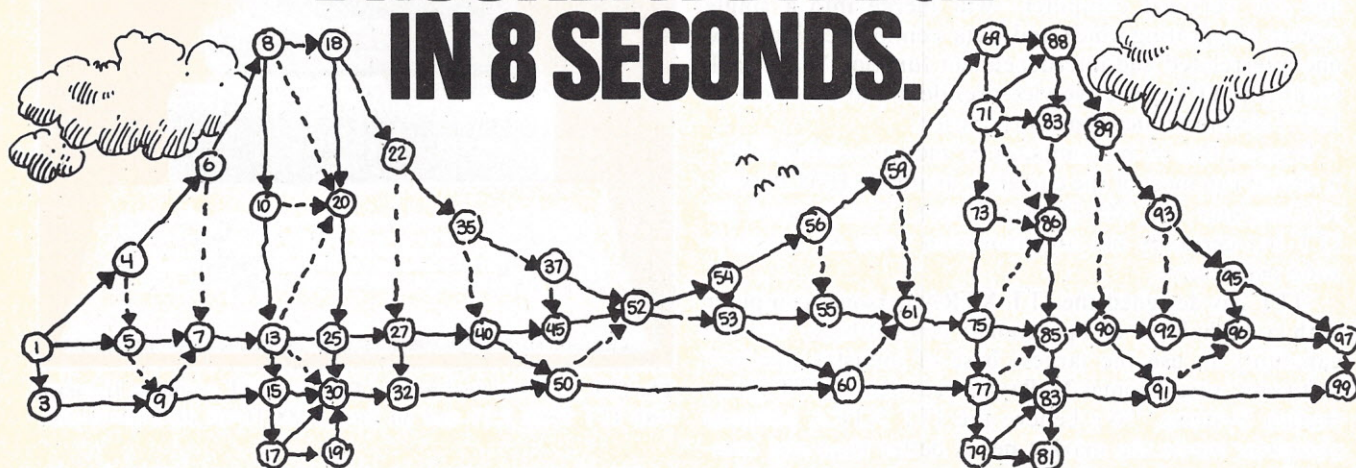
The standard features of the XTRA include 128k of

RAM, a single disk drive (although you can easily add a second drive as an option), both serial and parallel ports (one of each), and a socket for the Intel 8087 numeric coprocessor. The entire configuration will sit comfortably on almost any desk.

Design is key to the system's adaptability. The XTRA is designed to easily upgrade to a hard disk (a 10Mbyte Winchester hard disk drive is available from ITT). Unlike the IBM Personal Computer and its compatibles, you don't have to install a new power supply, for example. No system changes are needed on the XTRA.

The XTRA has room for five full-length IBM Personal Computer expansion circuit boards such as memory boards, the IBM Color/Graphics expansion circuit board, an on-board modem, and a Quadlink board. According to ITT, the XTRA can use most of the expansion circuit boards available for the IBM. In addition the company offers its own additional 128k RAM chips to completely "populate" the memory sockets on the computer's motherboard. The system's memory capabilities can easily be

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increased to 640k RAM by installing a memory expansion circuit board.

As system options, ITT offers both monochrome and color/graphic monitors. The 14" monochrome display is available in either green or amber. As part of its ergonomic design, the monitor can tilt and swivel. The 12" RGB monitor can produce 320 by 200 and 640 by 200 resolution graphics. ITT claims it uses a monitor technology which helps keep down the eyestrain sometimes experienced by users of personal computers.

In its standard configuration the computer will only accept a monitor with an RGB connector. To use a composite monitor, a color graphics expansion circuit board is necessary. And when not used with ITT's monitor, two power outlets are required: one for the XTRA and the other for the monitor. ITT has gone out of its way to design its monitors so they can only be used with the XTRA. These monitors use a standard RGB connector but receive power from the XTRA using an unusual power cord connector.

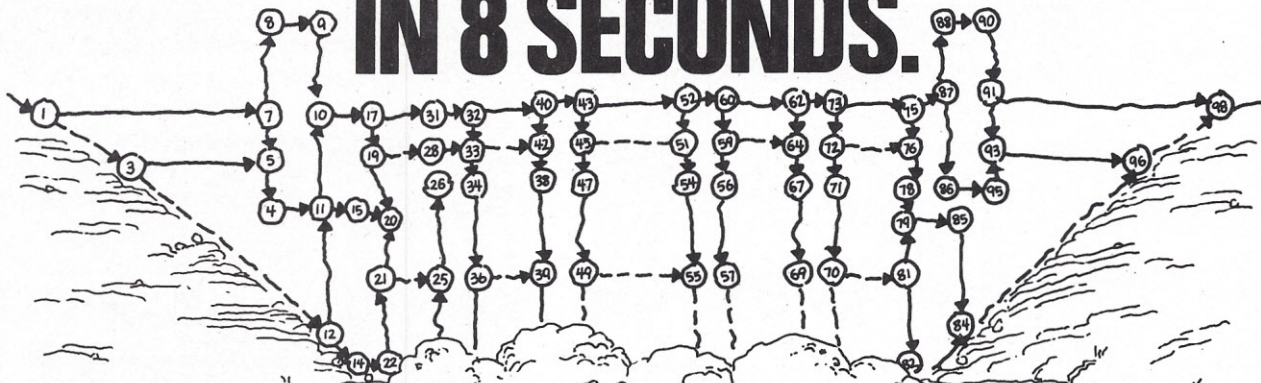


Data storage is provided through a single disk drive with 360k capacity. A 10Mbyte Winchester hard disk drive can be added.

The computer can be easily converted to handle European power sources. Simply open up the power supply and flip the power selection switch from 110 to 220 volts.

One of the drawbacks of XTRA is the lack of enough

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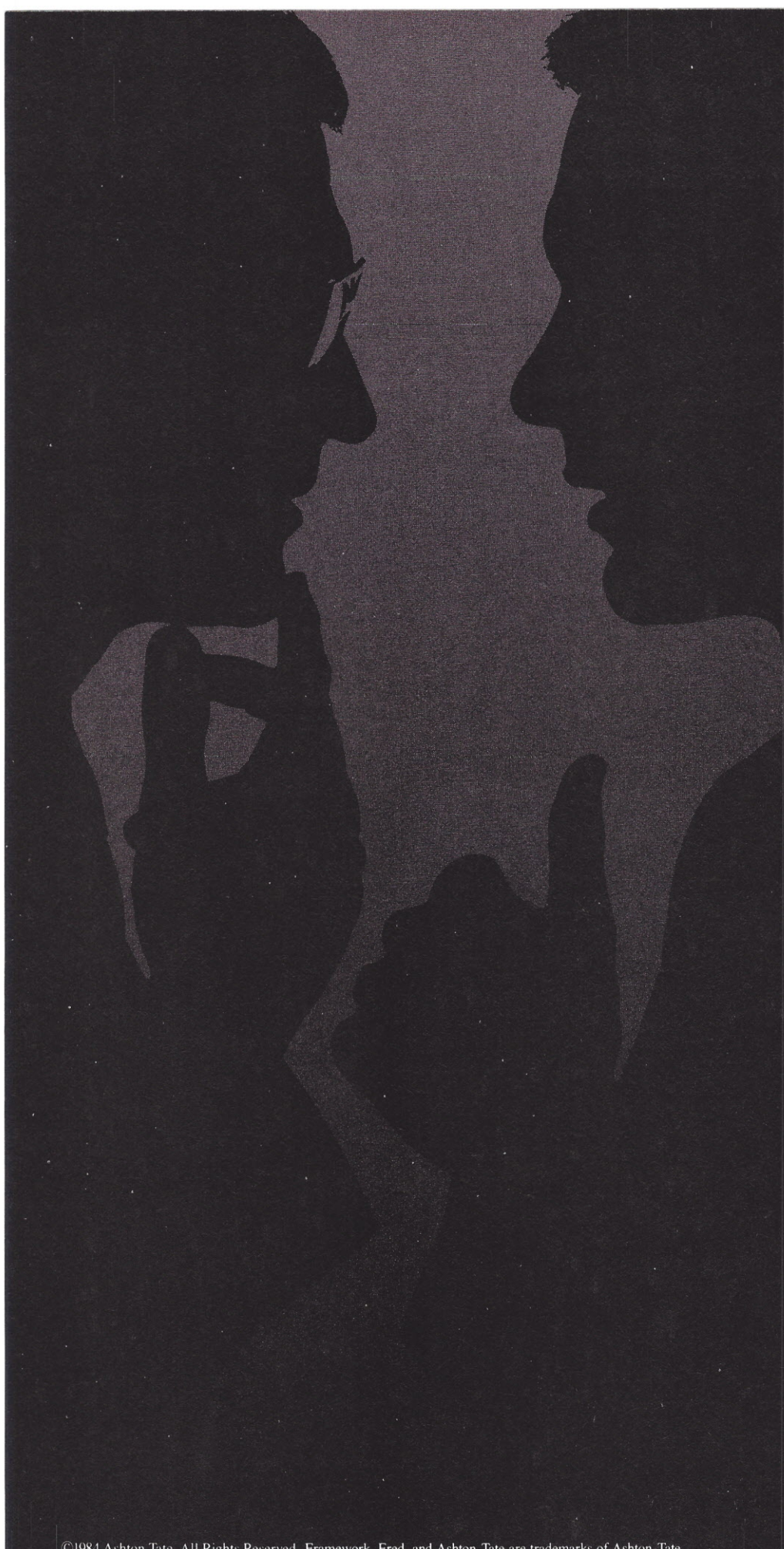
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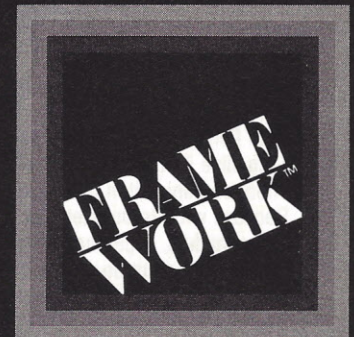
You can run PC DOS compatible programs like dBASE II[®] or 1-2-3 within Framework. You can write macros easier and faster than ever.

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I/O ports. There are only two: one, a parallel port, is labeled "printer." The other, an RS-232-C port, is labeled "communications line." If you are using a serial printer, ITT suggests you use the RS-232-C port. But what happens if you want to use a modem at the same time? ITT has two solutions: Disconnect the serial printer and connect the modem to the RS-232-C port or purchase an RS-232-C expansion circuit board. Both solutions work, but there would be no problem if two serial ports were standard.

ITT succeeded in eliminating one of the frustrating and time-consuming aspects of using the IBM Personal Computer and its compatibles—the automatic self-test that occurs every time you boot the systems. On the XTRA, this operation can be turned off by changing a DIP switch setting inside the computer. ITT has designed the XTRA so anyone can change a DIP switch setting or install an expansion circuit board without difficulty.

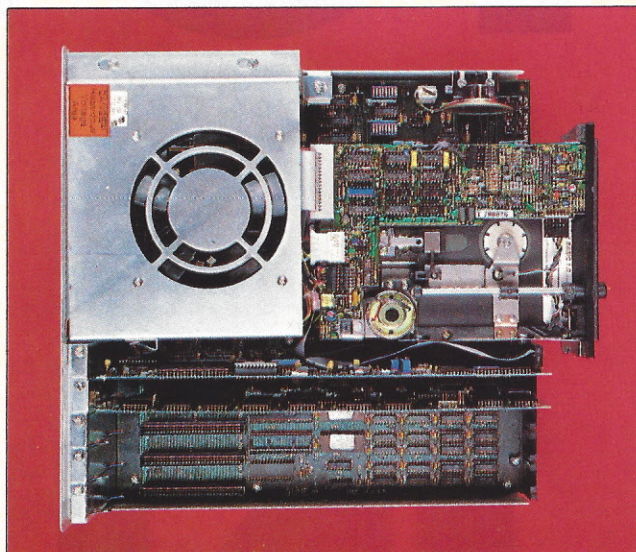
The computer will automatically shut off the monitor if it is left on and not used for 15 minutes. According to ITT, this feature prevents the display image from burning into the screen's phosphor side. The monitor can be turned on again with one keystroke. Like the self-test, this feature can be turned off if it is bothersome. However, it should prove to be useful in situations where people are frequently called away from their desks and forget to turn off their computers.

XTRA isn't considered to be especially fast. It has a clock speed of 4.8 MHz. Although there are other computers that will process information faster, the lack of speed isn't a major drawback. For instance, when using spreadsheet software, the speed of the XTRA is sufficient to handle most jobs as long as they don't utilize the maximum number of columns and rows in the program or incorporate exorbitant amounts of calculations and macros.

Eighty-four keys make up the keyboard's standard "QWERTY" typewriter-style layout. In addition, the XTRA also includes 10 programmable function keys, a 14-key numeric keypad, 15 editing keys and eight cursor control keys. A helpful add-on to the keyboard are two indicator lights—on the numeric lock and cap lock keys—which serve as status reminders for these functions.

ITT is also offering a three-button mouse as part of the ITT VisuAll option package. VisuAll is specially designed to incorporate the mouse to the application programs in the existing ITT Software Library.

ComputerLand, one of the major personal computer retail chains, is the first to agree to sell the XTRA through its 600 retail stores. Dealers will be prepared to sell and support the XTRA through training videotapes provided by ITT. The company hopes to expand its dealer base at the end of the summer. Meanwhile, the company will sell the computer to major corporations through its



The ITT XTRA contains a parallel and a serial port for added flexibility when adding an optional printer.

direct sales organization.

A likely configuration, according to ITT, will comprise monochrome monitor, two floppy disk drives and 256k of RAM, for a retail price of \$3850. The fully-loaded XTRA, with color monitor, one floppy disk drive, one 10Mbyte hard disk drive and 640k of RAM costs \$7450. Both configurations include the disk operating system. On this disk is Advanced BASIC and an asynchronous communications program. With the addition of a modem, the system is ready to transmit information.

The XTRA offers no great advancement of computer technology. It wasn't intended as such. ITT designed the XTRA to be a solid competitive personal computer that can easily grow with the needs of the user in the office environment.

ITT is counting on the company's expertise in the communications business and its capability to support the XTRA program as key factors in its marketing plans. The company has been supplying the corporate community with communications services for more than 60 years. Now, a reorganization of the company has tied together Qume Corporation, which manufactures computer peripherals; the ITT Courier Systems Division, producer of data terminals; and the ITT Information Systems Division, the group that manufactures and markets the XTRA. All are now under the umbrella of the newly formed ITT Business Information Systems Group, whose mission is to lead the company into the personal computer marketplace.

FOR MORE INFORMATION: ITT INFORMATION SYSTEMS, P.O. Box 52016, Phoenix, AZ 85072; (1-800) 528-1400.

—CIRCLE 303—

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PRODUCT REVIEWS

MAKING YOUR POINT WITH BUSINESS GRAPHICS

by James E. Fawcette, Executive Editor

Microsoft Chart, for the IBM Personal Computer or Apple Macintosh, not only gives you the power to customize your presentation graphics, but gives you an extensive gallery of predefined graph types as well. Chart's graphing capabilities allow you to turn a set of numbers into a graph, add labels and legends, move the numbers around, and then—with a few keystrokes or clicks of a mouse—turn it all into a different graph.

Chart is easy to use, partly because of excellent context-sensitive menus, and partly because of the wide variety of predefined graphs. But Chart's developers have also paid attention to the fine points. For example, when you are entering two columns of numbers, the first to be represented on a vertical axis, the second on a horizontal axis, one set of numbers is typically a straight series—such as 1981, 1982, 1983... or 1, 2, 3. Chart will automatically enter the year, or unit, or day as you enter the corresponding value. When automation can help, it is there. If it gets in the way, you can easily override it or change the default settings.

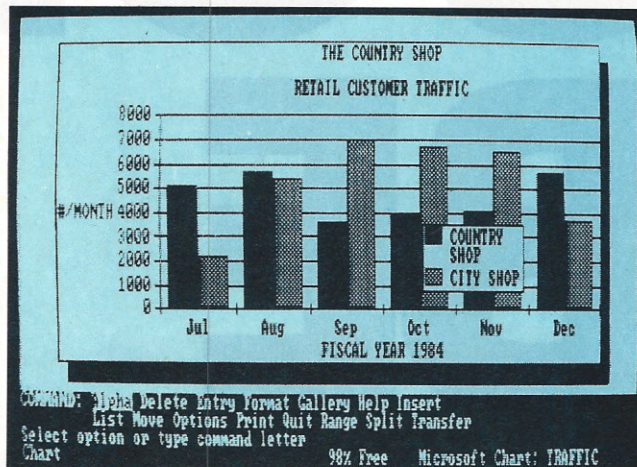
Although Chart's two versions, one for the IBM Personal Computer and close compatibles, the second designed solely for Apple's Macintosh, share the same basic idea, their environments have strongly shaped their development. The most obvious difference between the two is the way in which the commands are initiated. The PC-DOS version presents lines of commands along the bottom of the screen, prompts that will be familiar to anyone who has used Multiplan, Word or other application programs from Microsoft. If you're familiar with either of those programs, learning Chart will be even easier.

The Macintosh version is entirely different: A sharper, black and white image gives the program a different feel, and Chart for the Macintosh uses pull-down menus to replace the Personal Computer command prompts.

The other side

Beyond the cosmetic differences, however, there are some significant trade-offs. The Macintosh version allows you to load Chart graphs into Macintosh's clipboard, and then paste the graph into other Macintosh applications. For instance, you can create an elaborate graph in Chart, select it with the mouse, and save it to the clipboard. Later, you can recall the graph from the clipboard while you're in the middle of editing a lengthy document in Microsoft Word, the company's mouse-based word processor, and insert the graph. The document will print out on the Macintosh's Imagewriter, reproducing the graph in the middle of the text as you saw it on the screen.

All the other features of the Macintosh are well used in



Chart's graphs can tell a sales story effectively, or help you gain insight into the data you are compiling.

Chart, including the ability to scroll through the data entries, using the mouse to point at the Macintosh "elevator" pointers, moving or changing the size of the data window, clicking with the mouse to select and move not only the graphs or windows, but legends and labels within a graph.

For each Macintosh feature you give up, the IBM Personal Computer version gives you several other benefits, benefits that many users will find more valuable. While you can only see one graph at a time on the Macintosh, Chart for the Personal Computer will present up to 16 at once. Chart for the Macintosh can overlay two graphs at once, while the IBM version can overlay up to 16.

Chart for the IBM can print color graphics using a number of output devices, while with Macintosh you are limited to black and white graphs printed on the Apple Imagewriter, a medium-quality dot-matrix printer which is the only output device available.

In either version, Microsoft Chart has the tools to substantially improve your business communications. It supplies seven predefined bar chart formats, eight column chart formats, and six different types of pie charts. Chart allows you to fine-tune these. For instance, let's say that sales for a pair of stores vary seasonally. Putting this data first on a column chart allows you to compare data from the two stores, but what if sales per month sometimes dip below break-even? Then, simply set the x-axis at that figure and the bars will be shown as sales above and below break-even. The data is the same, but the impact is substantially different.

Microsoft Chart costs \$250 for the IBM Personal Computer and compatibles and \$125 for the Macintosh. **FOR MORE INFORMATION:** MICROSOFT CORPORATION, 107000 Northup Way, Bellevue, WA 98004; (206) 828-8080.

CIRCLE 300

READ ONLY

A review of the IBM Personal Computer family. Summer 1984



UP AND RUNNING

And Swimming, Building, and Baking. Building and baking? They don't produce gold medal winners, but they do figure in staging the Olympic games. So do 200 IBM Personal Computers (including software) that are part of IBM's sponsorship of the 1984 Olympics in Los Angeles. In fact, IBM PCs are hard at work in both sports and administration.

PCs are involved in a wide range of planning and analytical activities, though they don't provide official results of the various athletic events. Some events, for example, use the IBM PC to determine how competitors are seeded—who competes against whom. In other events, such as archery, the PC simplifies the complex task of recording scores and compiling statistics for each athlete as the competition progresses.

In events like gymnastics that depend on points awarded by judges, statistics can be kept on the PCs to analyze scoring consistency. Also, a whole range of information about individual athletes, past Olympics, and

world and national records, both past and present, can be quickly recalled and compared with the help of the IBM PC.

Last but not least, administration. Spreadsheet programs, such as IBM's Multiplan™, were used on the PC for planning and forecasting by nearly every administrative department, from Construction to Ticketing. The same departments speed up some of their day-to-day accounting tasks with the help of the PC and IBM accounting packages.

Departments with specific software needs developed special packages with the assistance of a programmer whose services are part of IBM's Olympic sponsorship. Specially designed programs include database management applications to help handle transportation requirements and inventory control programs to keep track of sports equipment and personnel records.

In short, there's hardly an area of planning and staging the 1984 Summer Olympics that the IBM Personal Computer doesn't play a part in. Maybe there *should* be medals for administration.

Multiplan is a U.S. trademark of Microsoft Corporation.

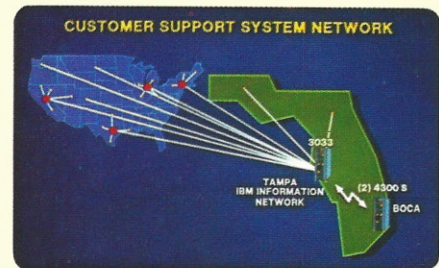


ON THE STOREFRONT

A Shorter Distance between PC Points. We're all familiar with the feeling of being lost in the growing maze of new computer products. IBM has opened a path through that maze, straight to the information and answers you need about IBM Personal

Computer Products—information about a specific software package or hardware configuration and answers to technical questions.

The key to entering this new information path is the IBM Customer Support System (CSS) at your authorized IBM Personal Computer retail dealer or IBM Product Center. Dealers in over 300 cities throughout all 50 states use the Customer Support Sys-



tem, which includes a nationwide communications network, to help give you instantaneous computer-age service support that's unmatched by any other computer manufacturer.

Colorful Stops along the Way. More than 1,700 authorized IBM dealers have access to a permanent and continually updated directory of IBM Personal Computer product information in IBM's Customer Support System. For a sharp color display of the type and level of information you want, visit your dealer or IBM Product Center and choose from lists of options displayed on an IBM PC color monitor. There are choices that guide you quickly and easily from product directories to in-depth product demonstrations and configuration information.

Since knowing how to take the first step is often a problem, CSS gives you a variety of possible starting points. By selecting the appropriate category—such as printers or business software—you can move to a list of specific products and then to the



Information from CSS with simple one-key commands

product demonstration you want. If you know a product name to begin with—Word Proof, for example—CSS will make an alphabetic search for it. To keep you up-to-date, there's also a special listing for new product announcements.

You can browse through the CSS displays at your own pace, pausing at a given spot or moving quickly backward or forward by using simple one-key commands that are always displayed at the bottom of the screen. One of these commands enables you to make print-outs of any information you wish to save for future reference.

The IBM PC family's color graphics capabilities make the CSS software demonstrations especially impressive. The Multiplan demonstration, for example, consists of several consecutive screens of information. Each screen is split vertically, with representative sections of the actual program on the left and explanatory text on the right. By the time you've seen the entire demonstration, you'll have a good idea of both *what* the program can do for you and *how* it does it.

Answers at the End of the Line. Over 1,000 authorized IBM retail dealers and IBM Product Centers are linked through their Customer Sup-

port System to the IBM Information Network. This nationwide communications capability helps your dealer give you fast, efficient service. Warranty claims, for instance, can be handled through CSS with a minimum of paperwork and delay. Dealers also use the network to communicate with other dealers and with IBM to keep abreast of the latest product and service information.

In addition, the CSS network is your gateway to technical information about the IBM Personal Computer family of products. IBM maintains a database on a 3033 mainframe in Tampa, Florida, that your dealer can use to answer—within minutes—a wide range of questions. If the solution isn't on hand in the database, your question can be submitted through CSS to a technical support staff in Boca Raton. There, it will be analyzed and an answer returned through CSS to your dealer.

The information used to answer your inquiry is added to the CSS database, where it will be immediately available for anyone else with a similar question. Your technical inquiries therefore contribute to the growth of the Customer Support System. Its on-line product information, color graphics displays, and advanced communications all have a single purpose—to help you get the most out of your investment in IBM Personal Computer hardware and software products.



HARDWARE NEWS

Color. There's color news for the IBM PC, IBM PC XT, and IBM *Portable* PC in the form of the IBM Personal Computer Color Printer. It's a high-performance, dot matrix printer that can print charts, graphics, artwork, and text in up to eight colors. The Color Printer produces color graphics that can enhance the appearance of your reports and presentations and make the information they contain even easier to understand. It can also type directly onto overhead transparencies.

The IBM PC Color Printer's range of performance features make it especially well suited for heavy-use/high-productivity applications. A near letter quality printing mode is standard. Printing speeds of up to 200

characters per second can help save time. So can programmable automatic control of print requirements such as print mode, line spacing, and margin and tab setting. These programmable features act as an extension of many software products—word processing programs, for instance—and can be initiated with just a few keystrokes.

A final feature for those who like a personal touch. You can use the Color Printer to personalize your documents by varying the printing modes, character spacing, and boldness. This allows you to differentiate



The IBM PC Color Printer

among headlines, subheads, and quotations and even to print math and science equations.

The Big Crunch. Not long ago, computing and number crunching were nearly synonymous. Personal computers and software for everything from office management to agriculture changed that, but the need for heavy number crunching has hardly disappeared. If it's still a part of your computer workload, the IBM Personal Computer 8087 Math Co-processor can help speed up your calculations.

The 8087 is a floating point co-processor that multiplies, divides, adds, subtracts, exponentiates, and performs trigonometric and logarithmic functions. It works together with the PC's 8088 processor to improve the execution speed of floating point operations by as much as 10:1. The Math Co-processor increases calculation speeds so greatly because it makes floating point operations a hardware rather than a software function.

In addition to increasing the speed—and often the level of precision—of statistical and analytical math packages, the Math Co-processor can improve the display speed of graphics and video games. It also significantly improves high-level language execution time, and is designed to work with the APL Interpreter and the version 2.0 Pascal and FORTRAN Compilers discussed next in this issue.



WHAT'S THE PROGRAM

We Speak Your Language. IBM Personal Computers are shameless polyglots. They can handle most of the popular programming languages you want to work with. Much of the credit for their versatility goes to the IBM Disk Operating System (DOS) 2.10. This updated version of DOS 2.00 was developed to provide support for the IBM PCjr as well as for the IBM PC, PC XT, and IBM *Portable* PC. So all members of the IBM Personal Computer family are united by a single master program that provides the required support between their hardware and a wide range of application programs.

More to our present linguistic point, the DOS 2.10 diskette contains two programs, Disk BASIC and Advanced BASIC, to help you write your own programs on an IBM PC. (IBM PCjr BASIC—a separate, optional cartridge—provides this support for the PCjr.) Disk BASIC adds DOS file support, date, time of day, and communications capabilities to the BASIC language that comes with every personal computer from IBM. Advanced BASIC adds advanced key trapping and advanced graphics—including viewports, windows, and paint tiling—plus music and other capabilities.

DOS has other features that help simplify advanced program development and design, including a line editor, a linker, background printing, and chaining of commands. For help with writing and editing particularly sophisticated BASIC programs, there's the BASIC Programming Development System, a software package that consists of two programs and four utilities. The first program includes a Text File Editor and a Structured BASIC Pre-processor; the second includes a BASIC Formatter and a BASIC Cross-Reference.

Native Translators Available. The IBM BASIC Compiler compiles or translates the BASIC programs you've written, down to native object code so they'll run on your IBM PC. And BASIC is just the beginning. DOS also provides the support you need to develop and run programs using the IBM Personal Computer Macro Assembler or the FORTRAN, COBOL, and Pascal Compilers.*

Two of these, the FORTRAN and

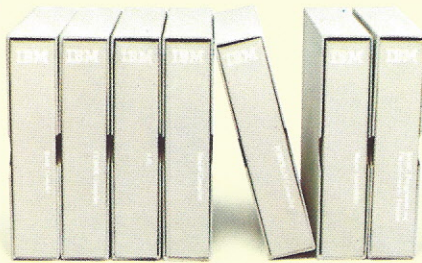
Pascal Compilers, are available in recently updated versions. IBM PC Pascal 2.0 is based on the ISO standard, and IBM PC FORTRAN 2.0 conforms to the ANSI-77 standard subset level. Both new versions feature improved arithmetic capabilities, and both support the IBM 8087 Math Co-processor for greatly increased speed in processing floating point calculations. (For more about the Math Co-processor, see "Hardware News" in this issue of *Read Only*.)

In addition, versions 2.0 of the FORTRAN and Pascal Compilers feature a Library Manager for creating user-defined libraries and provide easy access to all files in any subdirectory through DOS path support. FORTRAN 2.0 supports linking of object modules with subroutines written in Pascal 2.0 and vice versa. Both new versions support linking of object modules with subroutines written in IBM PC Macro Assembler.

There's a bargain in store for those who already own the 1.0 versions of these compilers: you have the option of buying an upgrade to the 2.0 version at a substantial savings from the full 2.0 price.

To ensure that your programming reach doesn't exceed your grasp, the IBM PC APL Interpreter enables you to write and edit your own programs in APL. It can also be used to exchange data files and workspace between your IBM PC and many mainframe computers.*

Finally, if you're inclined to make serious use of the IBM PC's array of programming aids, we suggest that you also take a look at the recently announced IBM PC Sort program. It provides support for data types and file organizations used by the IBM DOS-supported languages mentioned



Application development tools from IBM

above and can significantly speed and streamline your programming efforts.

IBM PC Sort can be used as a stand-alone utility, integrated into a batch job stream, or invoked directly from a COBOL program via the Sort verb. It can sort records from a data file

or files, merge multiple input files, selectively include or exclude records, and create an output file containing the records, pointers, or keys from the input files. There are no arbitrary limits in IBM PC Sort for file size, record length, number of keys, or number of input files.

*BASIC Compiler and Macro Assembler will run on the IBM PCjr. APL Interpreter will not. Although the IBM PCjr does not support FORTRAN, COBOL, and Pascal Compilers, most of their output will run on the PCjr if there is sufficient storage.

Now Get Organized. The IBM PC's ability to run a wide variety of commercially available programs and to help you develop your own applications may result in a good news/bad news situation. The good news is that you'll be able to satisfy your application requirements. The bad news is that you'll probably be the one responsible for keeping track of your growing library of programs. If, as we've often found, enthusiasm outstrips organization, you may find yourself falling behind—especially if you're working in an area, such as



Animation Creation software from IBM

small business finance or education, where programs multiply rapidly.

Fortunately, help is in sight, in the form of Fixed Disk Organizer, an IBM software package that does just what its name suggests.

Fixed Disk Organizer has a master menu that lets you sort out your various application programs by category—word processing, spreadsheet, communications, and so on. You can tailor the menu to your specific application needs by adding new menu categories, revising or deleting existing categories, or changing titles. The master menu allows you to review all the programs stored on your fixed disk at a glance and to call them up quickly with just a couple of keystrokes.

Fixed Disk Organizer also helps protect sensitive data by allowing you to create passwords and restrict access. It also enables you to write a

string of complex DOS commands into a batch file and execute them whenever you want simply by selecting that file from the menu. And in case part of your organizational problems stem from not always remembering just how things are organized, you can use Fixed Disk Organizer to establish Help files as a reminder.

So we're all in trouble—no more excuses for not being organized.

Moving Pictures and Mathematical Castles. Let's not forget that there's more to life than programming, compiling, and getting organized. There's also software from IBM for pure enjoyment and for enjoyable education. Two such packages are Animation Creation and Adventures in Math.

Adventures in Math incorporates math drills into an adventure game with vivid color graphics of a castle and its passageways and treasures. To find the way out—and to uncover as many treasures as possible along the way—children (or particularly skillful adults) have to solve basic math problems. The program's difficulty level increases as you solve the problems you're confronted with.

Using Animation Creation, you or your children can draw your own pictures and watch them come to life. To draw pictures, you select from 254 computer characters and position them on your screen. Add color by choosing any of 16 foreground and 8 background colors. Then, by slightly repositioning the images on successive screens, you can create animation.

Next stop, Hollywood.

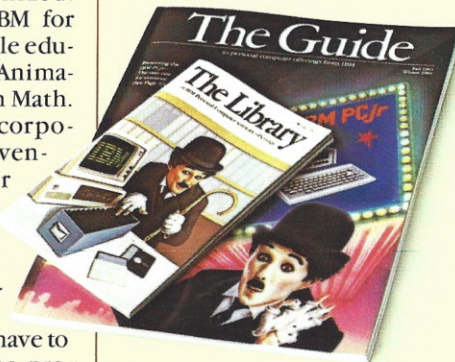


HARDCOPY

You Can't Enjoy the Game without a Program. Earlier in this issue (see "On the Storefront"), we discussed the Customer Support System for on-line information about IBM Personal Computer products. Much of that information is also available in two publications: *The Guide*, a directory of Personal Computer offerings from IBM, and *The Library*, a directory of IBM Personal Computer software offerings. If you want to enjoy the personal computer game, these are the "programs" you need to do it.

The Guide, published twice a year, is a catalog that contains clear, concise descriptions of IBM PC, IBM PC XT, IBM PCjr, and IBM *Portable* PC systems. It also reviews printers, video displays, expansion units, and all other IBM PC hardware products. A separate section of *The Guide* contains articles on IBM PC software packages.

Both hardware and software articles are illustrated



with annotated color photographs—of key screens for the software packages—and start with charts that provide quick product overviews. Other noteworthy features include sample configuration tables for all three systems and a closing section on Sales and Service Support.

The Library, updated quarterly, presents an overview in booklet form of the entire IBM PC software product line. It presents the software by category, with sections on Operating Systems and Languages, Personal Productivity, Communications, Business, Education, and Entertainment. Program descriptions are brief and to the point. Each includes a short overview, program highlights, and system requirements. There's also a chart at



the end of the booklet that shows at a glance which programs are compatible with the IBM PCjr.

Or the Hardware without a Manual. If *The Guide* and *The Library* are the general road maps to IBM PC products, the *Technical Reference* and *Hardware Maintenance and Service manuals**—now available in newly updated versions—are the detailed maps of downtown. It's not a trip everyone wants to take, but if you do, these are the right directions.

There's a three-volume *Technical Reference* set for the PC and another for the PC XT and *Portable* PC. These manuals include the functional specifications for the system units and for the options and adaptors in the IBM PC product line. The *Hardware Maintenance and Service* manual details many aspects of troubleshooting a personal computer from IBM. It includes a parts catalog, a section on preventive maintenance, and instructions for identifying the failure of a replacement unit.

*These manuals are intended for use by technically qualified service personnel.



TIPS AND TECHNIQUES

If you use Personal Editor—IBM's full-screen editor for writing programs and brief documents—but find yourself displaying the Help file whenever you forget a function key assignment, here's a little help from the fellow forgetful.

Function key assignments can easily be displayed on the command line of your Personal Editor screen by assigning F1 to display the unmodified keys and alt+F1 to display the alt+Fx keys. You can then assign the Help function to alt+H, although you probably won't need it nearly as often as before.

The macro for the F1 assignment can be written as follows: def f1 = [cursor command] [begin line] 'F: 2=Save 3=File 4=Quit 5=Erase 6=EraseEOL 7=Print 8=Switch 9=InsL 10=Ins&Indt' [cursor data].

For more information about IBM Personal Computer products, see your authorized IBM Personal Computer dealer or IBM Product Center. To learn where, call 800-447-4700. In Alaska and Hawaii, 800-447-0890.

THE GRAPHIC DIFFERENCE

by Robert A. Sehr, Associate Editor

IBM compatibility is just another feature claimed for the Mindset Personal Computer system, recently introduced by Mindset Corp. of Sunnyvale, California. It is the first system base-priced under \$2500 to have the capability to generate high-resolution graphics for both business presentations and arcade-style video games.

According to the company, the new system was developed to provide the graphics environment necessary for advanced user interfaces—higher resolution, color and smooth motion—by combining mathematical concepts originally developed for dedicated graphics processing systems with a high level of semiconductor integration.

From the moment you set your eyes on the unique stack-pack design of the Mindset, and the animated logo that appears before the system is booted, you realize that this is no ordinary IBM clone. Even though Mindset Corp. has not designed its computer like a clone, it has understood that in today's market the product must at least act like one—while establishing its own niche.

The Mindset's flexibility as a business and home graphics unit is emphasized in its portable packaging. Without a monitor, the system weighs 22 pounds and can be transported in its own canvas carrying case. At \$2495 for a fully configured system with two disk drives and 256k of RAM, (a monitor must be purchased separately) the Mindset is probably too expensive to be used as a game machine.

"We expect a lot of these systems will see double duty," says Chris Berg, director of marketing communications at Mindset. "They will be used in the office by day and at home by night."

The Mindset's graphics are the result of two custom-designed graphics processors that work with the on-board, high speed Intel 80186 16-bit microprocessor. The successor to the 16-bit 8088 chip that is common in the IBM Personal Computer and its compatibles, it is said to provide a 25 percent faster processing time for any standard IBM programs that run on the Mindset. The manufacturer's list includes Lotus 1-2-3, WordStar, Multiplan and Microsoft Word, among others.

The Mindset is said to accept most of the software written for the IBM Personal Computer, but outside of the Mindset's faster processing speed, the programs are no different from any other IBM compatible. As with everything else, there are a few exceptions to this rule. One of them is 4-Point Graphics Plus, by Imsi Software, an IBM Personal Computer package enhanced to take advantage of the Mindset's superior resolution and animation features. Other packages being modified for the Mindset include Microsoft Windows and GW BASIC.

The custom processors in the new computer run up to



Mindset offers high-resolution graphics—and animation—for both business presentations and arcade-style video games.

640 by 400 bit-mapped graphics displays on either a monochrome or RGB monitor or a television set. It is designed not only to improve the resolution of present-day graphics-oriented IBM software like Lotus 1-2-3 or SuperCalc 3, but to open up a new generation of low-end business graphics software that will take advantage of the system's graphics capability.

Specially designed graphics software

One of the first programs available for the Mindset is Lumena by Time Arts, Inc. Lumena—in more ways than one—is reminiscent of MacPaint for Apple's Macintosh, with some distinct differences. The most obvious difference is that Lumena makes available 16 different colors, chosen with the click of a mouse on a menu. (MacPaint uses Macintosh's black and white monitor.)

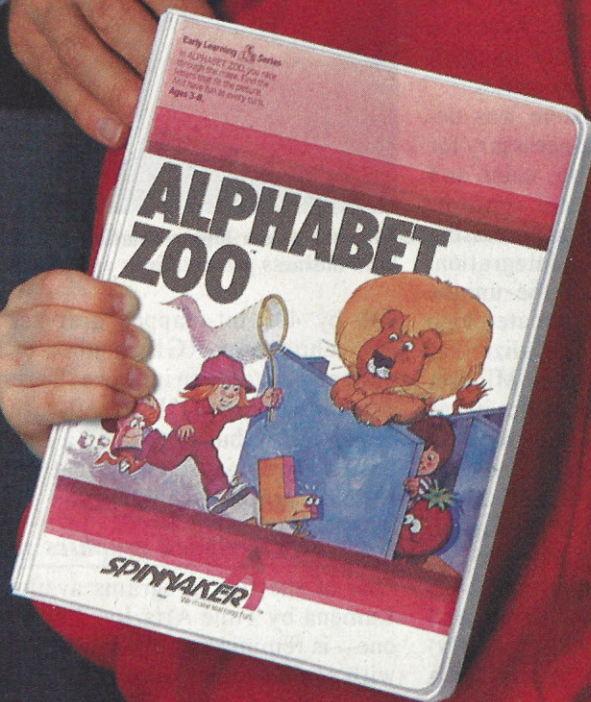
Instead of requiring the click of a mouse to get to various menus, as you have to do with MacPaint, Lumena's menu pops up whenever the mouse's cursor is moved to the bottom of the screen. When you slide the mouse away from the bottom of the screen, the menu disappears.

Lumena, which sells for \$400, is derived from a more sophisticated graphics program for high-end graphics systems from Time Arts called System 2—which sells for \$9600. System 2 offers 640 by 482 dot resolution, while Lumena offers a resolution of 320 by 200. Like Lumena, System 2 offers a palette of 16 available colors.

To illustrate Lumena's most graphic difference from MacPaint, a Mindset demo takes MacPaint's famed tennis shoe, adds colors to the shoe and then saves it. You can then replicate this image as many times as you want throughout the screen, using it as if it were a paintbrush. This can be done with any image or text combinations within Lumena.

Lumena also allows users to take advantage of the Mindset's unprecedented animation capability. In a separate animation menu, Lumena allows the user to

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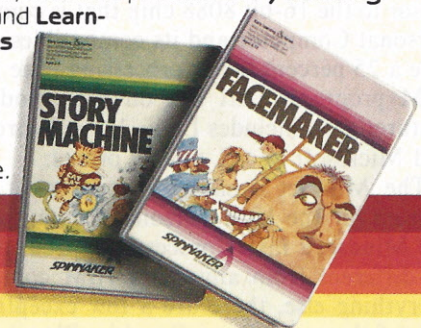
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liven up a graphics presentation by animating images on the screen. The still images can be saved on disk, or printed; in addition, the animation can be saved on videotape through a videotape recorder interface (included with the Mindset).

Mindset is banking on the fact that other software companies will create specific packages for the Mindset—despite the system's lack of an installed base. The company is predicting sales of about 50,000 systems in its first year, not exactly enough to inspire a software avalanche. Mindset is counting on the entrepreneurial nature of programmers, believing that they will be inspired by the opportunities inherent in the system. "We've already had a lot of interest in the machine from software writers," Berg says.

There are also opportunities for popular graphics programs like Lotus to be customized to take advantage of the Mindset's features—like animation—but market demand rather than any entrepreneurial spirit is likely to dictate whether or not any of these programs are cus-

tomized for the Mindset.

The package matches the machine's graphics in being pleasing to the eye. Instead of having endless stereo-like cables slithering out of its back end, the Mindset is put together in modules. A basic system module containing two removable ROM cartridges holds the motherboard processor and 64k of RAM. An expansion system holding up to 192k of additional RAM and two 360k floppy disk drives fits neatly on top of the basic module—tied together with connecting boards, rather than cables. The Mindset does not offer its own monitor, but you can choose from color and monochrome models.

In order to attract some of the home video game market, Mindset sells its package by the piece as well. The basic CPU, keyboard and ROM cartridge package with 64k of RAM can be purchased for \$1099. Users can also interface this system with a television set, although this somewhat defeats the graphics advantage.

FOR MORE INFORMATION: MINDSET CORPORATION, 617 North Mary, Sunnyvale, CA 94086; (408) 737-8555.

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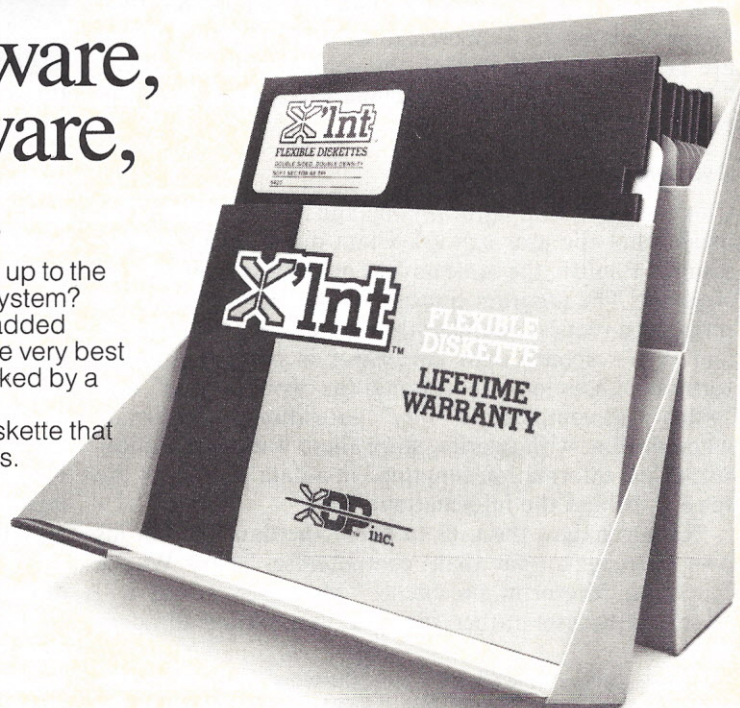
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**AN INTELLIGENT RELATIONSHIP WITH
YOUR DATA BASE**

by Elli Holman, Senior Editor

When Microrim introduced R:base Clout, a natural language interface for the R:base family of data base management products, the company promised a demonstration of the first artificial intelligence-based software product for personal computers. To say the least, that turned a few heads. When a software developer says "artificial intelligence" everyone listens. Everyone expects artificial intelligence to make a significant mark "someday." In fact, there are those who think artificial intelligence is already a functional technological reality.

This irony was not lost on Ken Scott, director of marketing for Microrim. While demonstrating Clout he recalled one of the company's early tests of this new product. It was shown to a group of professional users (people who use personal computer software extensively in their work) and non-users (people who have never used computers before). The reactions of these groups, especially the second one, were quite remarkable in this "computer age."

People who were more than a little bit familiar with computers thought a product like Clout was a tremendous innovation and advancement in the state of the art. People who never used a computer before said things like, "Aren't computers supposed to do that anyway." These are people who believe Hal, the computer in the movie, "2001" is an out-of-date machine, Scott said, and Hal could read lips.

Ask and ye shall receive

Clout is billed as a natural-language query system. This means that the user can ask Clout questions in conversational English, the same as if he or she was talking to an assistant. The program consults its internal dictionary to interpret a request, searches the data base it is working in, and then responds with an answer in several different formats. Questions containing the words "who" and "what"—as compared to "why"—are always a good start when dealing with queries, since these words are indicative of the information contained in a data base—not the reasons behind the information.

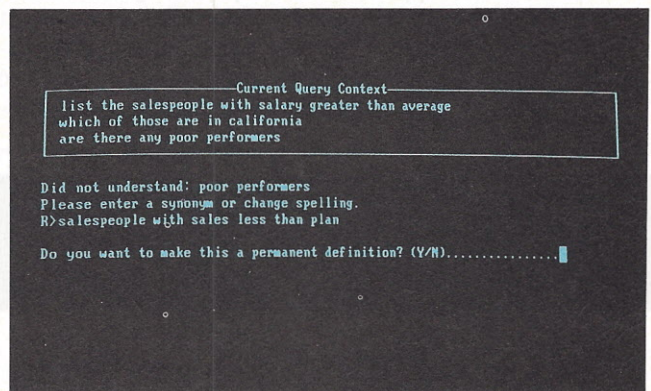
"Clout enables the user to query the data base in his own language rather than 'computerese,'" says Wayne Erickson, Microrim president. "Moreover, Clout will adapt to the user rather than the user having to adapt to it."

Clout starts out with its own 200-word built-in dictionary. And on installation, it will read the attributes in the existing data base and add them to the dictionary. Clout then allows the user to continue building the dictionary with synonyms for words associated with the data base.

The process begins with a "conversation" between Clout and the user, according to Microrim. The computer is queried with a word or series of words that are not already in the data base vocabulary. Clout responds with questions that direct the user to define the unfamiliar terms—to teach the program, in effect, the user's language. If the data base includes a field of data entitled "jobs," for instance, definitions for "occupation" or "work" could be constructed so that all three words would be interchangeable when a data base is queried about jobs.

Basing decisions on fact

As with most programs, especially those thought to be more complicated and intended for use in a professional



If Clout does not recognize a term or phrase, it will ask you for a new definition or a different spelling.

environment, it is always good to run through the program's tutorial, if it includes one. The tutorial contained on the Clout disk is very informative and it shows the most significant facts about the program in the simplest and fastest way possible.

The tutorial puts you in the shoes of the president of a high technology company called Opscan whose vice-president of sales has just resigned. You know that you want to replace him with someone from within the company but you don't know who and time is always of the essence. Records have been meticulously kept by not only your former vice-president, but also by your personnel and accounting departments. All you have to do now is review all of the information contained in the data base and decide on your replacement.

Since you are unfamiliar with the information in the data base, the first thing you do is review the fields, which in this case include projects, memos, people, contacts and travel. By reviewing these fields, or relations as Microrim calls them, you can see exactly what kinds of questions you can ask Clout to get the information you need to make your decision.

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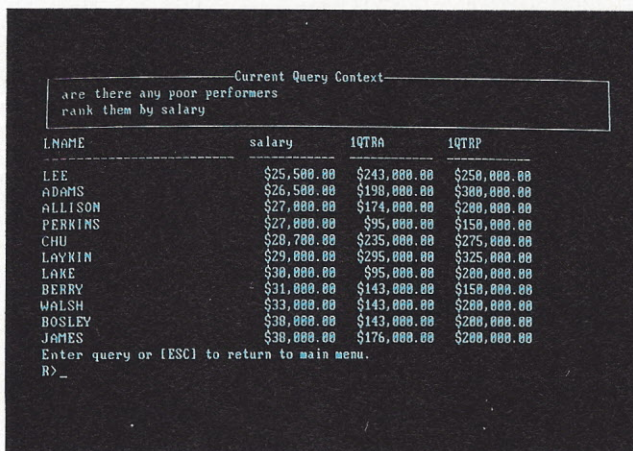


*Based on suggested retail price comparisons of U.S. Robotics, Inc. and Hayes Microcomputer Products, Inc.

PRODUCT REVIEWS

By the way, anytime you need assistance in Clout, the question mark key or simply typing "help" will get you just that. You can see information pertaining to the particular place you are at in the program, you can view the data base schema, you can get detailed explanations of the functions of Clout, and you can view the program's internal vocabulary.

Now let's get down to the nitty-gritty: asking your questions. You know that you want somebody who has company experience (length of service). To begin your



Current Query Context
are there any poor performers
rank them by salary

LNAME	salary	IQTRA	IQTRP
LEE	\$25,500.00	\$243,000.00	\$250,000.00
ADAMS	\$26,500.00	\$190,000.00	\$300,000.00
ALLISON	\$27,000.00	\$174,000.00	\$200,000.00
PERKINS	\$27,000.00	\$95,000.00	\$150,000.00
CHU	\$28,700.00	\$235,000.00	\$275,000.00
LAYKIN	\$29,000.00	\$295,000.00	\$325,000.00
LAKE	\$30,000.00	\$95,000.00	\$200,000.00
BERRY	\$31,000.00	\$143,000.00	\$150,000.00
WALSH	\$33,000.00	\$143,000.00	\$200,000.00
BOSLEY	\$38,000.00	\$143,000.00	\$200,000.00
JAMES	\$38,000.00	\$176,000.00	\$200,000.00

Enter query or [ESC] to return to main menu.
R> _

Clout determines the best way to present your information. Here, information is presented in tabular form.

search, you direct Clout to "Show me a list of employees and when they were hired." After a few seconds of sorting and searching, Clout will display such a list. By the way, while the program is searching your data base you will see a "speedometer" on the screen that informs you of the program's progress.

Note: If your request is over 50 characters long and you forget to put a period or a question mark at the end of your sentence, Clout will ask you if you have more to ask or say.

Your query has to do with sales experience. In particular, you want to know who has sales experience with a particular item, telemetry. So, you ask Clout: "Which employees worked on which projects?" "Who worked on telemetry and what was their security?" and "What were their last year's sales?" After each of these questions you will see your information being refined just a bit more with people being cut out of contention as each request is made. For instance, after your last question you can ask Clout to refine the list a little more by typing in, "Just the ones with clearance."

After this series of requests, you are now down to only four people in contention so here's where the questioning gets rough. You ask Clout to "Rank them by last year's sales in descending order" and "Sort them by year to date

commission." For the best way to present this information to you, Clout decides on the best format to get as much information on one screen as possible. In this instance, the program presented the information in tabular format as opposed to the previous request in which you received a list.

Clout is also capable of computations—add, subtract, multiply, divide, total and sum, make mathematical correlations, average and compute standard deviation. So, in the tutorial, you can ask the program, "Which ones had last year's sales greater than average?"

This question brings you to your last two candidates, Rogers and Anderson. It is now easier to make some comparisons. You ask: "Which companies and contacts did employees Rogers and Anderson work with? What were their cumulative sales?" It turns out that not only does Anderson lead in sales but he has also worked with a company called Telemetrics, which will probably be the main market for your company's telemetry products.

Now you can delve into Anderson's background a little more by asking Clout about his educational background and seeing the notes and memos that have been written about him by his co-workers and collected in the data base. In this area, the tutorial explains the program's ability to recognize ambiguous fields. For example, if you ask Clout to, "Show me Anderson's notes," it will recognize the word, Anderson, but because it found this word in several different attributes it wants to know what you mean by the word Anderson. You can now choose from a menu that you mean Anderson to be a last name.

In another example of the program not understanding what you mean, say you misspell the word "companies" by typing the word "campanies." The word "company" is known to Clout, and if you had typed "campany," the program could have guessed you meant "company" and would have said, "Do you mean company?" But because "campanies" has four different letters than the word "company" Clout asked you to enter a synonym or change the spelling.

The finishing touch

After you've run through the tutorial (and chosen Anderson as your next vice-president of sales—a well-deserved promotion according to all the data) you will have a pretty good idea of the capabilities of Clout. What is important about this product is that after it is "taught" your language, it is very easy to use and a step forward in the way people interact with a data base. After all, isn't that what everyone expects in a software package?

Clout is available immediately through retail distribution channels for \$195. It runs on the PC-DOS, MS-DOS, CTOS, BTOS and UNIX operating systems.

FOR MORE INFORMATION: MICRORIM, INC., 1750 112th Ave. N.E., Bellevue, WA 98004; (206) 453-6017.

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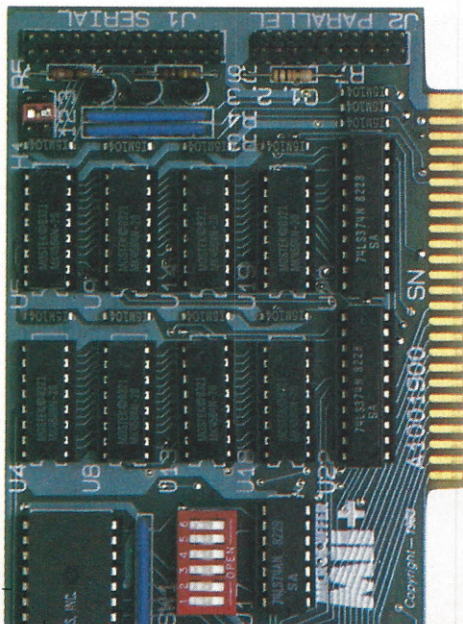
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Microbuffer II comes in either a serial or a parallel version with 16K or 32K of RAM. Microbuffer II+, available with 16K, 32K or 64K, has both serial and parallel capabilities, so you can control two different printers at once. The Microbuffer II+ has on board high resolution graphics routines for 37 popular printers, and all include expanded graphics capabilities and text formatting in addition to the inherent benefit of letting you use your computer while your printer is working.



Microbuffer In-line for virtually any computer/printer combination.

These are stand-alone units that install In-line between virtually any computer and printer.

Besides printer buffering, the In-line serial interface (MBIS) can be used to efficiently transmit data from the computer to almost any device using a serial RS-232C interface. The parallel Microbuffer In-line (MBIP) is built exclusively for parallel interfacing, and works exceptionally well in virtually any parallel computer and any parallel printer.

Each of the stand-alone models have controls for making multiple copies (up to 255). With the pause control, printing may be halted at any point and continued later—it will pick up right where it left off. Even while you are printing copies of a document, additional files can be sent to the buffer and they will be processed in turn. Both

come with either 32K or 64K of RAM, and are easily upgradable up to 256K for processing greater amounts of data.

Microbuffer/E for Epson printers.

Fully compatible with Epson MX, FX, RX, and IBM-PC series printers, these easy-to-install boards simply plug inside the printer.

For parallel interfaces, the Microbuffer models MBP-16K and MBP-64K are available.

For serial interfacing, Microbuffer models MBS-8K and MBS-32/64K are available. The MBS-8K supports both hardware and software (X-ON/X-OFF) handshaking; the MBS-32/64K supports three handshaking configurations (hardware, software X-ON/X-OFF and ETX/ACK).

SO WHAT ARE YOU WAITING FOR?

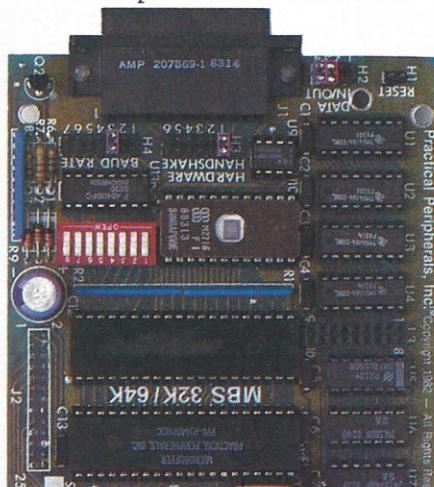
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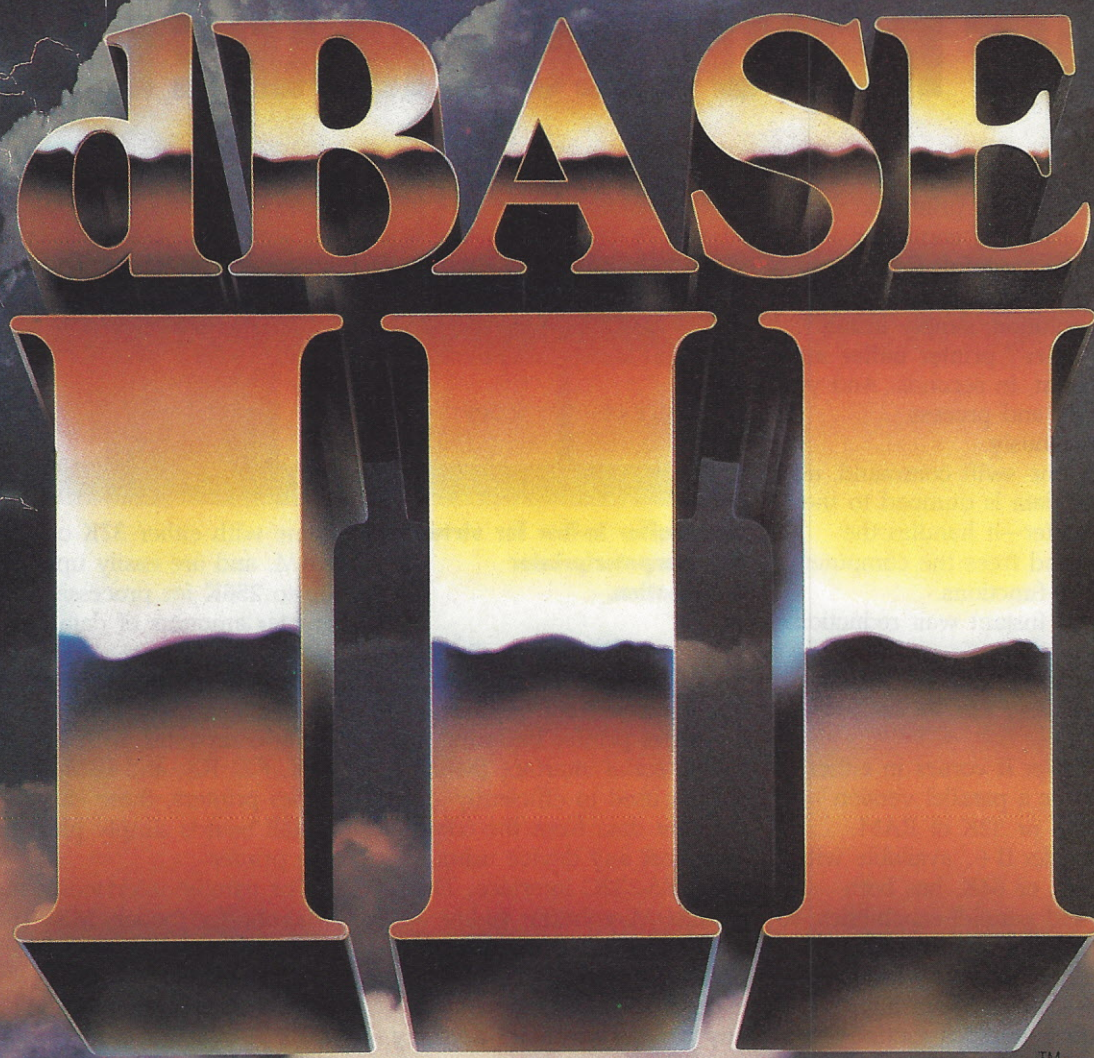
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SORD's new IS-11 CONSULTANT, is quite simply, the most advanced portable lap computer you can buy. With its imaginative integrated software for word processing, data base management, calculating, telecommunications and even graphics, the IS-11 is unmatched as a business or personal total computer. The IS-11 includes more standard features than any other computer of its size.

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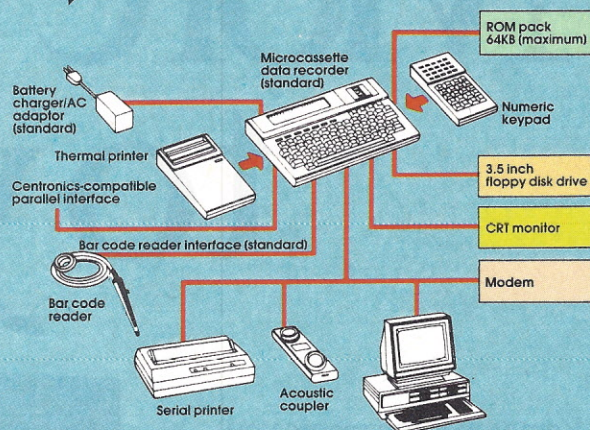
The software-driven microcassette recorder stores up to 128K of data at 2000 baud. The easy-to-read 8 line by 40 character display is the first in its class to use Windowing. A full-size 72-key keyboard with 6 function keys; NiCad batteries provide power continuously for 8 hours.

Standard supplied interfaces: serial, parallel, modem jack and

Centronics printer interface. Optional equipment: a 40 character per line thermal printer; a numeric keypad with 16 function keys; bar code reader; and more. A 3.5-inch microfloppy disk drive and CRT video interface will be available this Fall.

The CONSULTANT is the first portable to offer a complete integrated system environment, one in which the application software and the system software have come together for user ease. It was this SORD software concept that revolutionized Japanese management procedures and which is now in use by Citibank as well as others in over 45 countries.

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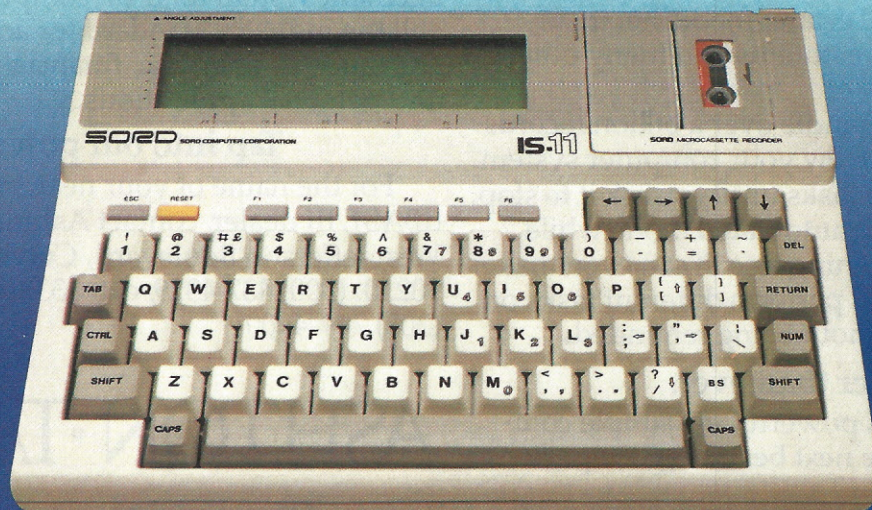
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SIX PRODUCTIVITY TOOLS IN ONE INTEGRATED PACKAGE

by Cecilia Wessner, General Editor

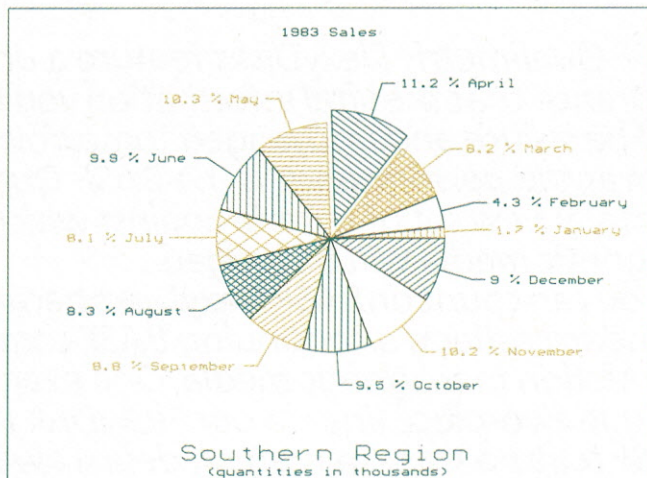
Decision Manager, the latest release from Peachtree Software, offers users six programs in one integrated package. By combining a word processor, spreadsheet, data manager, graphics and communications compatability—including communication with mainframes—Peachtree has produced a productivity tool worthy of executive status.

Like many of the newest integrated software packages, Decision Manager uses a "windowing" system which allows you to define up to 20 different projects or "windows" at a time. Up to 10 windows can appear on the screen simultaneously, and you can switch between these projects without manually closing files or changing applications. Although this windowing technique is useful in itself, the ability to move parts of one application into another application is Decision Manager's most powerful and useful feature.

Although the software's main strength lies in its integration, its individual applications are capable and efficient. The word processor, while not fancy, allows you to perform all the basic text editing and formatting that you can with most popular word processors. For instance, you can insert and delete characters, words, lines or blocks of copy, scroll up or down by line or page, set tabs, search and replace, repeat searches, and mark specific passages to be moved elsewhere in your document. Print features include flush right, left or centered copy, underline and boldface.

In order to create a word processing document—or any other document—you must first create a window through which you view your work. You begin by choosing the Make Window option from the Select Action pop-up menu that appears as soon as the software is loaded. After choosing this option, you are shown a second menu from which you can choose one of the program's six applications. You select Word Processor and are asked to name the window you'll be working with on-screen. Then you Enter the document—which is one of the choices from the command line that appears on the bottom of the screen—and give it another name. Ultimately, this second name will appear on your directory or catalog of word processing documents. After two more key sequences, you can begin writing.

This long sequence of start-up commands is tedious, but unfortunately, there's no way to avoid it. To Quit the word processor, the routine is similar, but fortunately there are only three commands you'll need to use. Although you'll probably tire of using so many commands, you won't find them difficult. Decision Manager prompts you at almost every step. If you need more assistance, you



Because Decision Manager is integrated, you can take information from your spreadsheet and construct a visual representation such as this pie chart. Your data can be graphed.

can call up a series of Help screens by pressing F1. While in the word processor, you can also choose an auto-Help option that provides you with automatic Help screens after each selection you make.

After you've gotten used to some basic word processing commands, you may still have a question about naming the window versus naming the document. You'd logically expect that the first name you give Decision Manager will appear on the word processing directory after you save your work. Instead, the second name appears. What Peachtree has done is allow you to call your current windows by related names, so that even if the documents you're working on—say, Sales Memo and January Data—seem unrelated, you can relate them on-screen by calling them both Today's Work.

The spreadsheet part of the program, like the word processor, is functional and easy to master. As with other popular spreadsheets, you can manipulate data and perform what-if calculations, but don't look for special features. If you need a 254 row by 63 column spreadsheet that allows you to adjust column margins, left or right justify numbers or headings, display formulas, move columns and rows, etc., Decision Manager will probably suit your needs. Available mathematical functions include addition, subtraction, multiplication, division, partial sums, minimums, maximums, square roots and trigonometric calculations. As with the other applications programs, you can mark a section of the spreadsheet to be included in a report or memo, and using a few keystrokes, transfer that section in just a few seconds.

If, after creating a spreadsheet, you wish to portray some of its data visually, you can move on to Decision Manager's graphics application. The graphics part of the program can not be used unless you have already created

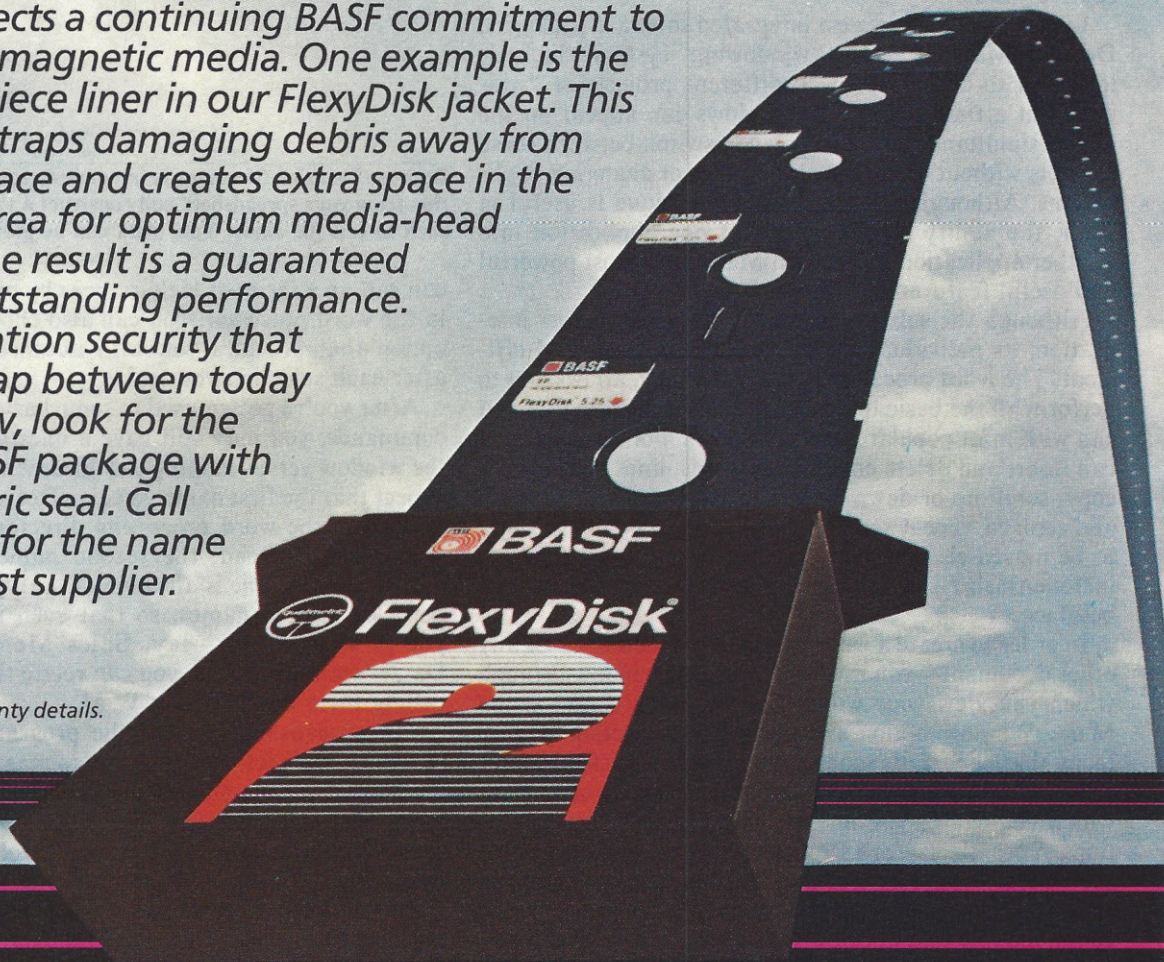
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BASF

a file in another application from which to pull data for graphing.

Like moving information from the spreadsheet into a word processing document, moving information into the graphics application is fairly easy. You are prompted with on-screen menus and can call for Help at any time. But when it comes to creating an actual graph or chart—line, bar and area charts, word charts, histograms, scatter charts and critical ratio charts are some examples—the program gets more difficult. You have to decide which type of chart or graph will best represent your data, and in order to learn your way around the numerous commands, you'll have to experiment with different options and refer to the manual frequently.

Once you have created a chart, you'll have a product any marketing manager would be proud of. The on-screen color graphics are excellent, but you'll need a multi-pen plotter or dot-matrix printer for hard copies.

Decision Manager's data manager is a record-keeping system that lets you set up information in any format you choose. Within each data file you can have up to 32,000 records with 60 fields per record and 80 characters per field. You can sort through your records and print reports based on any criteria, or use the data manager in conjunction with other applications—like a name and address file together with the word processor to do form letters. And if you need to keep certain records confidential, you can code them with a password system.

When you want to send files from the data manager electronically to another computer—or send files from one of the other applications—you can use Decision Manager's telecommunications program. You can also hook up to information utilities like The Source or CompuServe and public access bulletin boards. According to Peachtree, the software uses error-detection techniques that ensure data integrity.

If you've used communications software in the past, Decision Manager's program should give you little trouble. The on-screen menus will help you get started, but in addition to these menus, you'll have to study the manual and possibly get help from someone who has experience with communications software if you're a newcomer to this application.

The Decision Manager mainframe link, according to Peachtree, lets you view mainframe data on your computer and pull information from the mainframe data base. You can, says the company, receive whole screens of data with a standard default template, or create your own templates to receive only selected information from the mainframe. When you receive data, you can choose to have it automatically loaded into the word processor, spreadsheet, data manager or graphics part of the program.

Decision Manager is easy to set up: You load the eight

program disks into a directory on your hard disk, along with the LINK.EXE program from your IBM DOS disk. Once the programs are loaded, you should follow the tutorial in the manual before exploring the separate applications on your own. This will not only get you familiar with commands and formats, but will give you practice with Decision Manager's windows.

The tutorial takes you through each of the applications programs. It is time consuming. Sample documents, spreadsheets and data manager files are provided, so you won't have to worry about losing your valuable data. If you've never used any of these applications before, plan on spending about two hours with the tutorial before en-

Decision Manager runs on the IBM Personal Computer with one double-sided disk drive and an independent hard disk of at least 5 Mbytes, or on the IBM Personal Computer XT. It costs \$625.

FOR MORE INFORMATION: PEACHTREE SOFTWARE, 3445 Peachtree Rd. N.E., Atlanta, GA 30326; (404) 239-3000.

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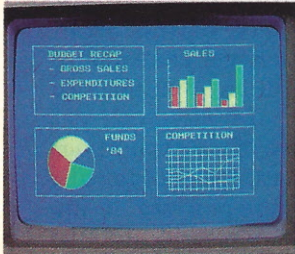
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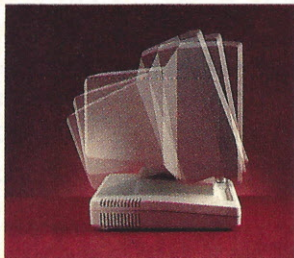
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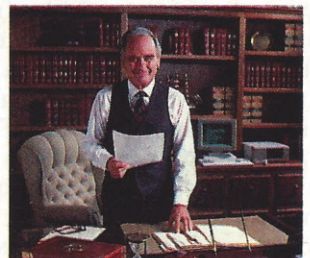
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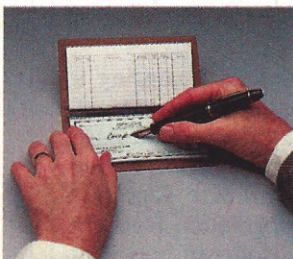
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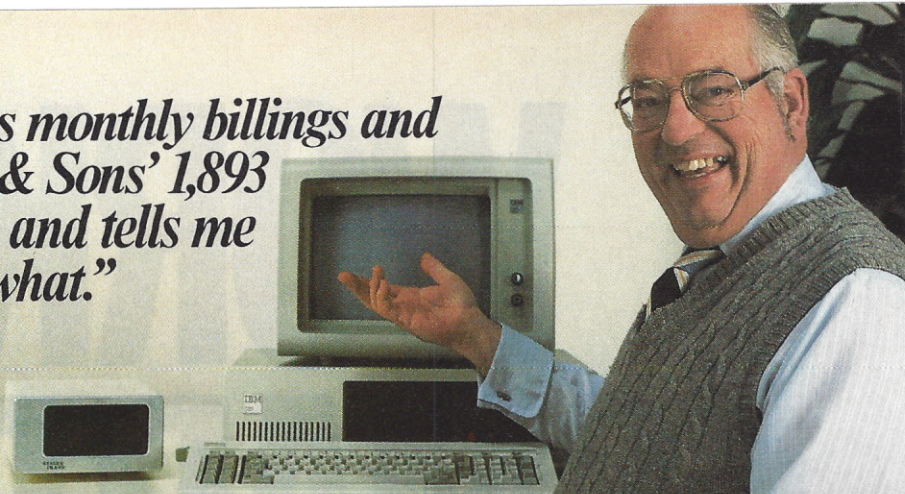
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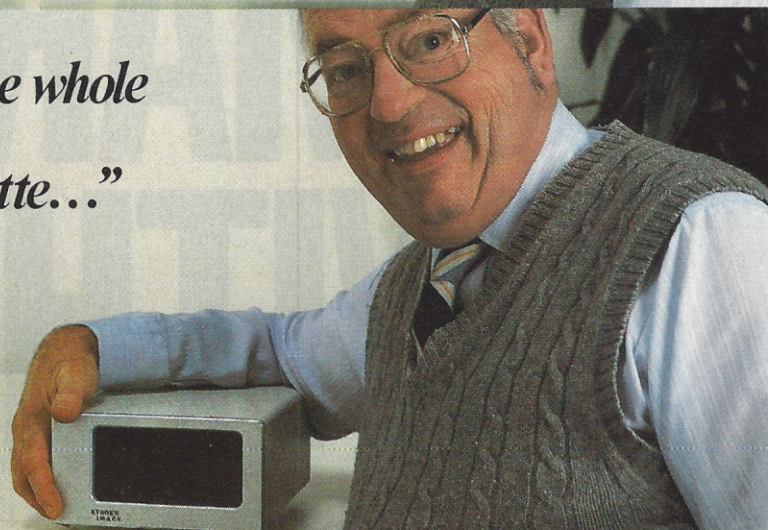
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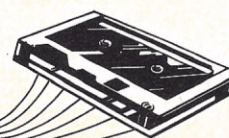
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Exercising New Options In The Computer Age

■ The Hawaiian Connection ■ Computerized Bartering
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Making An Electronic Move For The Better

Living in an exotic place with a warm climate year-round is a dream most of us have probably nurtured at some point in our lives. But for most, it remains just that—a dream. After all, there are careers to be thought of, along with the everyday reality of living where the jobs are. But we forget that with the age of personal computers comes a new dictum: Living close to the job isn't nearly as crucial as it used to be. Computers transcend distance and time, opening up a whole new world of alternative lifestyles.

The Brown family—Bob, his wife Sharon, and their son Jeffrey—are one example of people who have taken advantage of the living and working options afforded by personal computers. Just a few years ago, they lived in Massachusetts, where Bob published *The Direct Connection*, a career-planning newsletter for computer and communications professionals. Today, they reside in Honolulu, Hawaii, where Brown and his small staff produce the newsletter on Compaq and IBM personal computers. And they publish it—how else?—electronically.

The idea for the move was hatched seven years ago, when Brown decided to go into business for himself. He and his wife had long had a goal of

spending three months each year—preferably January, February and March—in the Hawaiian islands. The desire to escape the cold New England winters was part of it, but Sharon had been raised in Hawaii and missed her family.

The plan was to make enough money in their nine months in New England to support themselves through the next three months in Hawaii. In order to live out their plan, Brown figured he would need the flexibility of his own business. No conventional job, he reasoned, would

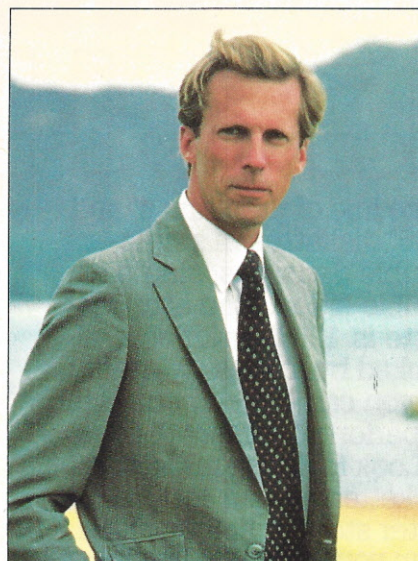
allow him to take that much time off. So using his systems analysis background, he hung out his shingle as a consultant/recruiter for computer or communications professionals.

The newsletter began simply as a promotional tool to let people know about his company. Brown wrote about the “human side” of the computer and communications professions. He hoped the publication would increase his business. While the newsletter succeeded in attracting praise from computer professionals who received it, it didn't attract many more customers and therefore, not a lot of money.

Before long, Brown realized he was having more fun publishing his newsletter than being in the recruiting business. He decided to make a change. He got rid of his staff, changed his business to a publications company and started accepting employment ads for the newsletter. Soon the circulation for *The Direct Connection* was up to 12,000 copies.

In December 1980, Sharon decided she was tired of the New England snow and wanted to be close to her family. Pursuing her career in banking, she initiated contacts with Hawaiian banks and received a job offer. So Bob Brown closed up shop and the family packed up and moved. That was March 1981.

“Our original idea was not to move to Hawaii permanently,” Brown says.



Photograph by Bob Mohr

Bob Brown publishes *The Direct Connection* from Hawaii. It now appears electronically on CompuServe.



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"I didn't think I'd be able to make a living there in my field. But after I had moved to Hawaii, I thought I'd better figure out a way to make some money."

Brown initially looked for consulting work, but found it scarce because he was new in Honolulu. "I was told by more than one person that people will ignore you for the first two years you are here. The assumption is that you're not going to stay." He worked for a data processing magazine for a few months until his consulting work began to pick up. But it still wasn't enough to make the dream of living in Hawaii a reality.

Brown also missed publishing his newsletter and considered starting it up again. But the problems of putting out a traditional "paper" newsletter from Hawaii were a real barrier.

"I thought, 'Here I am, living in paradise, but I'm really not happy from a work standpoint.' I wanted to republish *The Direct Connection*. I sat down and 'spiced' out what would be involved. The logistics were just impossible. The costs involved with trying to move that much paper halfway across the ocean were just not viable."

So he adjusted his sights a bit and came up with a way to surmount the distance problems—he would publish electronically.

He put together a plan and a proposal and in July 1983, he approached CompuServe, the on-line information service, with his idea: an electronic newsletter, available to CompuServe subscribers, for computer and communications professionals. By November, Brown and CompuServe representatives had reached an agreement—"negotiated electronically"—and a contract was ready to be signed.

Brown's newsletter—still called *The Direct Connection*—appears today on CompuServe. (To access it, CompuServe subscribers simply choose "services for professionals" from the main menu, then "com-

munications/data processing" from the next menu. It is an option on the following menu.)

Reading *The Direct Connection* costs the user nothing more than the regular connect costs one pays for accessing CompuServe. Though Brown's original plan was to produce something akin to his New England newsletter, the project has expanded considerably.

Currently, it is made up of four parts—The Computer Wire, Computer Job Bank, Computer Resume Bank, and Industry Standard Data Bases.

The Computer Wire includes the career planning information that Brown's original newsletter carried. But it also has a news section that came about purely by chance. "Early on," Brown says, "by accident, a company sent me a photo and a press release for a piece of hardware." He threw it away without much thought, but it must have lodged somewhere in the back of his mind. A few weeks later when he saw exactly the same photo in a computer magazine, he started thinking. He knew he could beat conventional papers with news since electronic publishing doesn't have the lengthy "lead time" of print media.

That discovery led to more discussions with CompuServe representatives, which in turn resulted in The Computer Wire—an industry newsletter which delivers up-to-date news on the computer industry.

The Computer Job Bank provides job listings for the computer and communications field. It's the electronic equivalent of conventional classified employment ads. Though, again, this service costs the user no money beyond connect costs, the companies that place ads in the job bank do pay for them. Brown says there is a "tremendous cost difference in companies being able to put a listing up on the job bank" as opposed to traditional methods. "The cost is markedly less on the electronic ver-

sion. Plus the ad will stay on-line, accessible seven days a week, 24 hours a day, for six weeks."

An experimental Computer Resume Bank is also part of the service. A CompuServe subscriber looking for a job in the computer or communications field can send in a "mini-resume" on himself which will be posted for all subscribers to see.

The last area currently on *The Direct Connection* is Industry Standard Data Bases, a collection of text and statistical data bases that are of interest to computer and communications professionals. It includes a "world conference calendar," which lists the dates and locations of communications conferences. Brown calls it "a tool for conference planners. If someone is planning a conference four or five years down the road and you inadvertently pick the same date, it can kill your conference."

Brown plans to expand the data bases shortly. "We're in the process of gaining electronic publishing rights to some reference material of interest to communications and computer professionals," he says.

Brown says he thinks services such as *The Direct Connection* are the wave of the future. "This country has evolved from communities of geographies to communities of interests," Brown explains. "We're like a community newspaper."

"Services like *The Direct Connection* will be one of the major manifestations of the information age. There have always been specialized newsletters, but until the last couple of years it has not been economically feasible to communicate electronically. Now it is becoming very feasible. Everyone is going to be using personal computers. The personal computer is the new telephone; it's the personal communications instrument."

But some things never change; the Browns seem to have come full circle. "My wife and I are now talking about the possibility of spending summers in New England!"

"Excuse Me,



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CIRCLE 38

Trade: A Yacht For Some Log Cabins

A man in Texas wants to sell his \$550,000 yacht. But how many people can afford to spend half a million dollars for a boat? And how does one even go about finding a buyer for something like that—place an ad in the local paper? Post a notice on the bulletin board at the supermarket?

There's another solution—trade the yacht for something you can use. Or better yet, get your cash out of the deal by trading it for something you can sell.

The Exchangors Work Group, Inc., of Naples, Fla., has made a business of putting together deals just such as this one. As "real estate exchange brokers," they exchange all sorts of properties among all kinds of people. For the man with the yacht, for example, they arranged a trade with a company in Utah—the yacht for 25 precut log home packages. The Texas yachtsman took the log cabin kits, built the homes on vacant lots he owned, and sold them. He got his cash, the Utah company got its yacht, and somebody somewhere ended up with brand new wooden houses. The exchange not only met everyone's needs, it allowed the customers to retain control over tax consequences—an advantage not normally associated with a cash sale.

Putting together even a relatively simple exchange involves reams of details complex enough to make the average realtor's head spin. Exchangors Work Group has found that using a Kaypro 10 personal computer makes tracking all those bits of information easier.

"Every property offers some benefits," says Dave Bowen, exchange counselor for the Exchangors Work Group. "To determine what those benefits are, we spend a heck of a lot of time with the people and find out what they're trying to accomplish. That's where a lot of the computer



Co-owner Jack Page uses Perfect Filer to generate contracts with "all the blanks all filled in."

work comes in. It doesn't replace the brain work. We have to be able to connect what people want to do with what they can do and what's available out there. But once you've handled the creative part—you've put someone together with a piece of property that makes sense—once you've done that, you have to make all the numbers, all that information come together."

With the computer and the word processing program WordStar, the staff is developing a series of "counseling forms" to help them obtain all the information from people that they'll need to fill in the exchange puzzle. "The forms are a uniform method for tracking data from different people," Bowen explains. Counselors throughout their own two offices use the forms to extract pertinent information from clients. They plan to pass out the forms to other exchange brokers as well, so they'll all be working from the same client information.

"By nature, there is more cooperation with other exchange offices than with more traditional realtors," Bowen says, "because it takes more to

put together a trade. If we can get everyone using the same information, we can do it. We can put together deals."

An example of the details that can go into a deal: In 1983, staff members put together an exchange that involved 10 properties, four states, three brokers, six conventional loans and four created loans. Writing up the contracts alone, not to mention the rest of the necessary paperwork, was an overwhelming job. The success of the deal won them the 1983 "Exchange of the Year in the State of Florida" award.

But successful property deals take more than efficient document handling. Exchange brokers have to track the types of properties that people are willing to trade, the location and zoning of land that's up for exchange and financial benefits offered by various deals—tax advantages, for example, or liquidity. And for every deal that goes through, the brokers have information on hundreds of other properties they weren't able to trade.

All this information is being cataloged in detail on the Exchangors Work Group's computer. Data on each client, each property and each financial nuance is recorded. The company is in the process of implementing a computerized filing system that will automatically put information into the appropriate files.

Exchangors Work Group is also working on some other, more innovative applications for its computer. According to Jack Page, co-owner of the company, they plan to devise an "index of probability" to determine what type of deals would be of interest to which clients. It would be based on facts about the property, the client and his needs, and what the client has done in the past. "Certain test questions will rank the probability of a transaction and give ideas for possible transactions based on offers between owners and brokers," Page says.

The office also uses Perfect Filer

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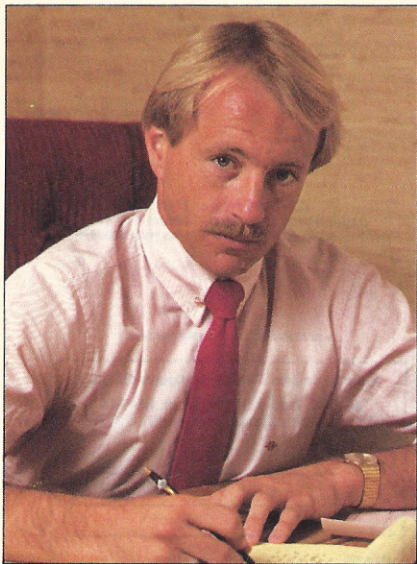
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("designed to merge mailing lists," Page says) to generate contracts with "the blanks all filled in." The idea, he says, is to put client information into the computer where it's retrievable, rather than entering it over and over again as offers are made. "Not only is it convenient and time-efficient," says Bowen, "but it saves a lot of exasperation. There's a total lack of reward when you've typed the same thing over six times and changed two words."

Inter-office electronic mail will help the realtors track the status of various deals, a point that's especially crucial since exchanges often require a joint effort between several brokers. And they're using Perfect Writer for a daily diary system to help them keep closer tabs on each day's work.

Page and Bowen believe the exchange business will be changed by the computer and that there will come a day when people won't travel as frequently to "exchange meetings" to discover what properties are up for grabs. "People are slowly beginning to accept working at a computer keyboard instead of face-to-face," Bowen says.



Dave Bowen has helped make the Exchangers Work Group a successful electronic real-estate vendor.

Computers On Borrowed Time

Some local public libraries are trying to dispel a stereotyped image: a cavernous, musty-smelling building with walls of shelves filled with dog-eared books, and a stern, unsmiling, bespectacled librarian presiding at the front desk. At some public libraries today it's possible to borrow audio cassettes, rent video cassettes or even hack away at a personal computer.

The Upper Saddle River Public Library, a small, non-regional library in an affluent suburban area of New Jersey's Bergen County, has entered the computer age in a big way, with three different personal computers on the premises for use by its patrons.

Early in 1982, library director Michael McCue began researching the possibility of using a personal computer to simplify the library's administrative paperwork. At the same time, he wanted to find a personal computer with enough versatility to satisfy all of the library's patrons, from preschoolers to adults.

"The idea was to try and combine what I wanted to do for the library as a small business with a personal computer and also have one available for the public," says McCue. "I felt that while the school children, in particular, were getting the exposure to computers, the adult population—as well as the school children themselves after school, at night and on weekends—just didn't have the access to computers. I just thought it would be a natural place for anyone to come and test drive them, so to speak."

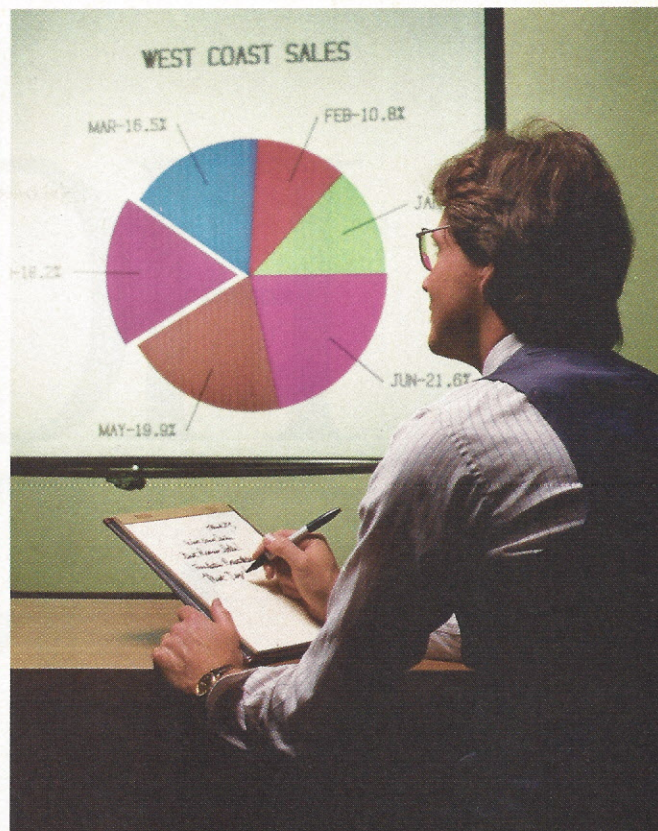
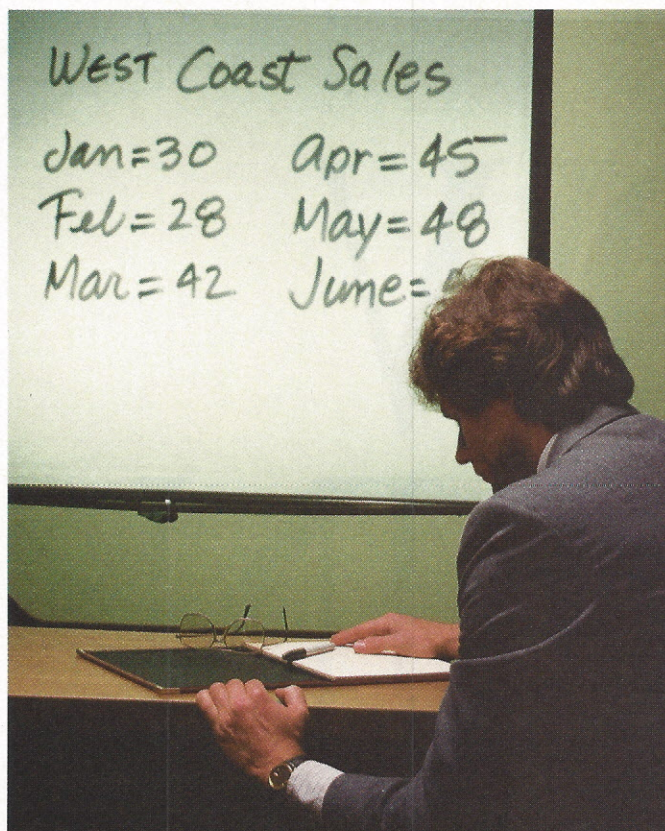
After about eight months of research, McCue decided that the IBM Personal Computer was right for the library's administrative work and that the Apple II Plus was perfect for the patrons to use. "I was getting kind of schizophrenic about how I could meet my needs in terms of running

the business. I knew I wanted an IBM, yet have the diversity of the things for the public: preschoolers, school-age children, some business things for the home-type programs," says McCue. "The Apple seemed to be the best machine for that."

Libraries rarely enjoy liberal budgets, and proposing the purchase of a personal computer above book acquisitions to a board of trustees is not an easy sell. McCue presented his dilemma to his board and then, he says, "One November night, my board stunned me and said, 'Go and buy two.'" In addition, the Friends of the Library—a group of citizens that raises additional funds for its local library—purchased a used TRS-80 Model I for the library's use. "It doesn't do too much," McCue says. "But you can practice your BASIC on it and I'm not so worried about the kids pounding on it; it's proven to be very durable."

McCue hesitates when asked why he chose an IBM for the administrative work. "Everything must be put in its timeframe," he says. "Understand that when I was doing my research, it was during 1982 and the IBM was only about nine-to-12 months old. It was making a big splash, getting a lot of reviews. I knew IBM was not going to go away. IBM has the name, whereas some of its compatibles were just coming out; there were names that you had not heard of at the time. Who knew that they weren't going to go under like the Texas Instruments machine, or that they weren't going to have copyright problems like the Franklin? I would probably seriously investigate the Compaq machine today, but at the time, who knew Compaq? The IBM had the clout, the name. I still think it's a fine machine."

McCue hasn't computerized his entire operation yet. He sends the library's payroll and bookkeeping to a large, local data processing firm, but he uses the IBM and VisiCalc to do the library's monthly financial



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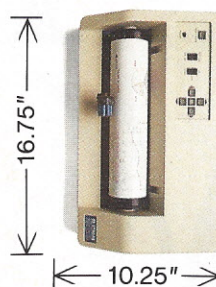
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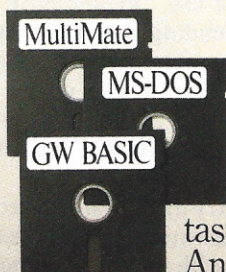
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THE CORONA PC

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and budget statements. And the library's circulation system isn't computerized. "We still manually count up how many things we've loaned every day, but at the end of the month I put the totals on a spreadsheet.

"There is a video circuit in the libraries in Bergen and Essex counties," McCue continues. "There are 31 libraries that either rent or loan video cassettes to their patrons, and they rotate once a month. I'm keeping track of the circulation, so that when we buy next year's packages, I'll know that '48 Hours' went out a lot and that 'Faust' and 'Rigoletto' did not." This way, McCue explains, if opera buffs complain about the lack of new opera video cassettes, he can present solid evidence to support the library's purchases.

While the Apple II Plus is available during library hours to all patrons, the IBM is only available to people who have experience with the machine. "Anybody who talks with me first can use the IBM," says McCue. "I don't want a novice coming in here because there won't be anyone to help them. It's only available at night or on weekends because it is located in our office and I can't have people traipsing through all the time. There are students who use IBM Personal Computers at the local high school and they'll make an appointment and come in at night or on the weekends when school is closed."

McCue says that the number of children using the Apple II Plus outweighs the number of adults. ("Not too many of the adults who have come down here have said, 'Wow, the machine won't go up in flames if I touch it; there are all sorts of neat things I can do for myself, my children, my club, my church.'") And they have come back. The adults who come back tend to be those who are taking courses at various local adult schools. There is one man who comes in once or twice a week and test runs his programs because it's easier for



Director Michael McCue has made the Upper Saddle River Library a more exciting place by adding computers.

him to come here than to get to his school."

Patrons can choose from over 75 software packages to run on the Apple, but in the beginning, the arcade games were the most popular with the children. "We didn't have a joystick," McCue says. "We wanted them to at least learn keyboarding. We started out with some video games—Frogger, Castle Wolfenstein—because they would get the kids started on playing with the computer. Then over time we learned that for the most part, kids were not advancing to the more educational games—Wizardry or Ultima. Some of the kids were just sitting there and banging away at Frogger. So when those disks did wear out, we didn't replace them. We don't have any more arcade-type games. Some of the educational games have the appearance of arcade games—Mix & Match, even MasterType—but there's some learning going on there."

The Apple II Plus has 64k of memory and two monitors. "We started out with a green phosphor monitor," McCue says. "But we

found that just wasn't sufficient for the games. We had an old color TV, but it had been in storage too long, and the picture wasn't very good. So we went out and got a color monitor."

The library charges 50 cents an hour to use the computer (the TRS-80 Model I is available free of charge) which includes any paper used on either of the two dot-matrix printers. (The IBM has an Epson; the Apple an Okidata.)

"It's a token payment, I'll admit it," says McCue. "I think it lends a little bit of responsibility for the kids. You've got to come to the desk and pay a fee and leave your library card. You have to fill out a registration form that says you'll sit there with just two people, you won't create a ruckus, you'll obey the copyright laws and basically that you'll treat the machine with respect."

Despite its heavy usage, the machine has remained virtually unscathed, even at the hands of children. "A key broke off once and a disk drive went out of line," McCue says. "But we've never had anyone pop the top and steal the microchips."

The library stocks a good selection of software packages for both the Apple and the IBM, but they are only for in-house use. "People have asked me about lending, but I am just not comfortable with that. First of all, for which machine do you do it? I just don't have the funds to be able to satisfy all the different type models out there."

The library also conducts seminars and demonstrations to help acquaint its patrons with the different personal computers and software packages on the market. McCue feels that these seminars and demonstrations help educate people interested in computing without subjecting them to a high-pressure sales pitch which they might encounter at a computer or department store. "It's just been one more thing to allow us to stay in the public's mind," says McCue.

—Susan Jelcich

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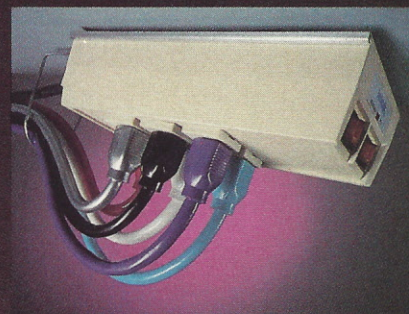
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CIRCLE 112



A Bookstore With A Computerized Touch

Wander into a typical bookstore looking for a book about a computer-related topic and you're likely to hear these words from the salesperson: "All of our computer books are over there. They're filed by author, and good luck because I stay as far away from them as possible."

At least that's been the experience of Dan Doernberg, who now runs Computer Literacy, a computer bookstore in Sunnyvale, California. Doernberg became "hooked" on computers a few years ago only to discover there were no good sources of information for the non-technical person. "Back then the computer stores didn't carry a lot of books, the bookstores didn't carry any computer books and the public libraries only had old books about mainframes."

Doernberg decided he could improve the situation by providing customers with an alternative book-buying atmosphere. "I wanted a place where a person like me could walk up and say 'I want to understand something, where do I start?' I thought, 'Wouldn't it be great to open a bookstore?'"

So a year and a half ago, after working for a couple of computer companies and doing some intensive computer study on his own, Doernberg and his wife Rachel Unkefer were ready to open the store.

With over 5000 titles in stock, Computer Literacy is a computer enthusiast's dream. There are books on almost any computer subject, no matter how obscure. "If a (computer) book exists, there's a pretty good chance we're going to know about it and have it in stock," Doernberg says.

Books are arranged by subject, rather than by author to help customers find what they need. And the salespeople know about the books they sell. They're able to point people to publications that will give them the

information they're looking for.

Computer Literacy's location in the heart of Silicon Valley provides it with a unique clientele. With Amdahl across the street, and National Semiconductor and Apple buildings nearby, many of the store's customers are "heavy duty engineers," programmers and middle managers at technical companies. "It's particularly the younger, sort of ambitious people, the people who really want to be on top of their jobs that are usually our biggest book buyers," Doernberg says.

A big part of the staff's time is devoted to keeping up with computing trends, not an easy task in such a volatile industry. One minute a subject like 8-bit computers with CP/M operating systems is all the rage, the next minute it's old news.

Today's hot subjects are Unix—"It's sort of the latest craze in this area," says Unkefer, "and almost any book on the IBM Personal Computer. Artificial intelligence is also a big topic."

It's service like this that is earning Computer Literacy a national reputation. People call from all over the

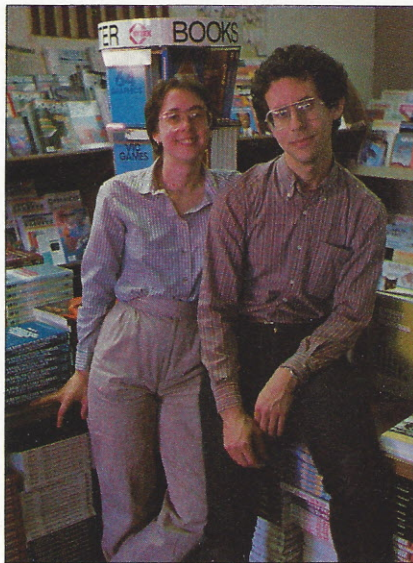
country to order books, or sometimes just to chat and get the staff's recommendations. "A lot of times, we do a sales job to convince people *not* to buy a book," Doernberg says. A case in point—books published simultaneously with a new computer's release. "Ninety percent of the time, those early books are no darn good." Exceptions, he says, are some of the books on the Apple Macintosh. But most of the time, he says, hastily released books "give real surface coverage."

With such a technically proficient customer base, Doernberg has to make sure he stocks a wide variety of advanced computer books. But he also stocks plenty of books for the 30 percent of his customers who are non-technical, home-oriented computer users. "We cover the gamut. Everything from introduction to computers, introduction to programming, on up to books for research and development for engineers," he says.

"We spend a big portion of our day looking for obscure books. General bookstores just don't have the time or the resources to go to anyone but a mainstream publisher. A general bookstore is never in a million years going to touch some of the books (from small publishers) we carry," he explains.

"One of the things that people use our books for," Unkefer says, "is as a job tool. When they're going to go out and look for a job, they'll figure out the hot job topics. Then they'll come in here and say 'I have an interview tomorrow and I need to learn assembly language.' Around here, it's very job intensive."

Job intensive, yes. Computer intensive as well. The enthusiasm of people when they discover that Computer Literacy is an entire bookstore devoted just to their interests tells the story. "It's a store for people who really are interested in computers," Doernberg says. "You don't have a feeling for the store until you see people attacking the shelves." 



Photograph by Patrick Lyons

Doernberg and Unkefer opened their bookstore, Computer Literacy, in the heart of Silicon Valley 18 months ago.

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AT&T Enters The Market

AT&T has made the long-expected leap from communications to personal computing. This special report outlines the company's marketing strategy. It includes a critical look at the new AT&T Personal Computer and an on the record interview with key AT&T executive Jack Scanlon.

by Charles L. Martin, Editor

Like a classic science fiction thriller, the battle of the technological giants has begun. AT&T's long-expected entry into the personal computer marketplace has become a fact and the battleground, at least in the beginning, is in nothing less than IBM's solidly entrenched, PC-DOS backyard. According to James E. Olson, vice-chairman of the board of AT&T and chairman of AT&T Technologies, "We intend to play in the market, and play in it well."

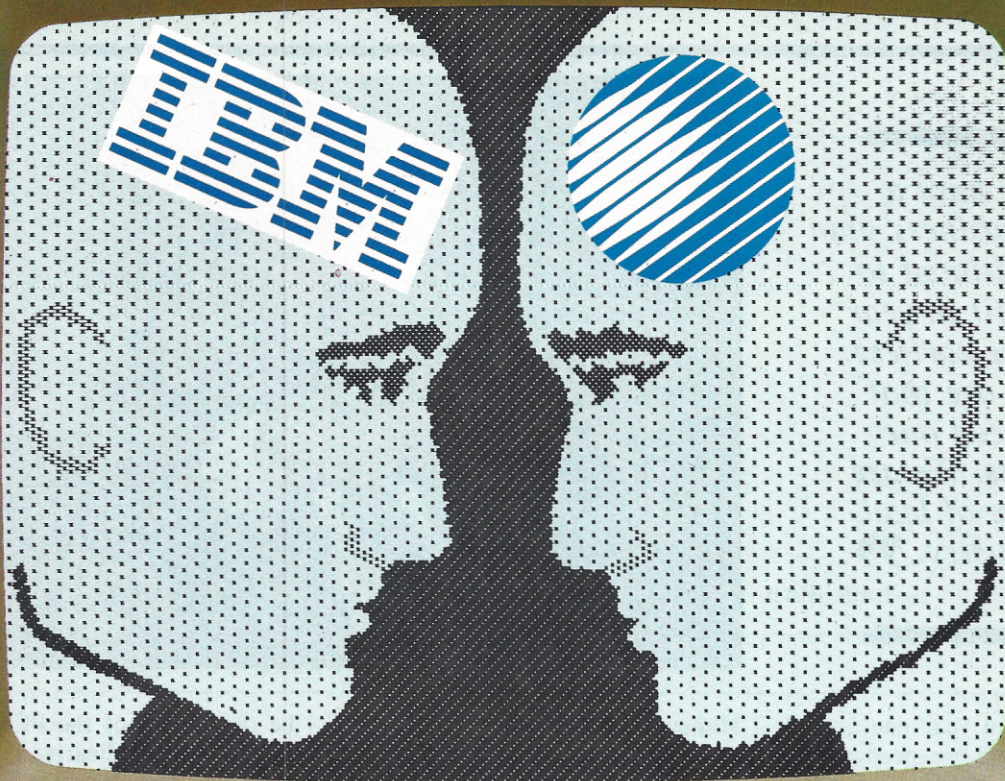
What 'playing in it well' means to AT&T officials is that the company intends to lead the computer industry

by offering the user a way in which to achieve complete integration of his computer resources—linking micros to minis to mainframes. To achieve that in the most cost effective—"and realistic"—way, AT&T will attempt to make its UNIX operating system the "industry standard," provide a personal computer that will allow users to run their existing MS-DOS software and, at some point in the near future, UNIX, and provide the means for those users to link together their personal computers with minis and mainframes. Not only that, they intend to turn a profit on their AT&T Personal Computer "in year one."

"We intend to be a leading pro-

vider and integrator of business office automation systems that enhance voice, data, office, building, factory and network management," says Olson. "Drawing on our historic strengths in voice and network management we are moving into the broader arena of information movement and management."

Yet, in what seems to be a major contradiction to its announced marketing strategy of turning UNIX into the "industry standard," AT&T's personal computer, (see review, page 72) is an IBM-compatible computer based on the MS-DOS operating system, a system which has become the de facto industry standard since IBM



Computer graphic by Ina Saltz/Photographed by Aaron Reznay

announced its Personal Computer in August 1981. In fact, the AT&T entry will be the only major player in the market with a machine that is 100 percent PC-DOS compatible. It is faster by 30 to 80 percent than a comparable IBM Personal Computer, has better graphics capabilities, and is equipped to connect to the UNIX-based line of 3B products, and will be, according to AT&T, "comparably priced." Nevertheless, the surprise here is that AT&T would produce what many will see as nothing more significant than an IBM look-alike.

In an effort to implement their marketing strategy of providing a way for users to run their existing MS-DOS software, and at the same time connect personal computers to

both minis and mainframes, AT&T is also introducing a local area network (LAN—pronounced 'lane') which will allow personal computers to communicate with each other and share common resources; a 3B5 computer with an applications processor which will integrate the company's PBX systems 75 and 85 with office applications; new retail distribution channels for the 3B2 and 3B5 computers previously announced but only available through AT&T account teams; additional software for the 3B2 and 3B5 family of mini-computers; and, the beginning of AT&T software for the personal computer.

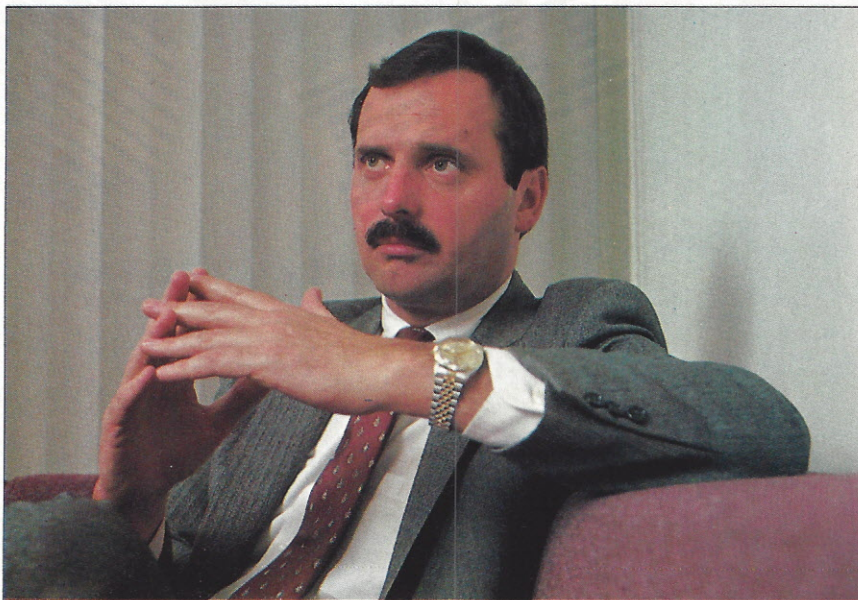
As of June 27, one day after the scheduled announcement, AT&T's personal computer was slated to be on sale in 500 retail outlets across the

U.S. Although negotiations were not complete at press time, AT&T executives said their machine would also be available at selected stores of ComputerLand, Genra, Microage, Compushop, Americasource and Sears. According to John Boyd, national director of distributor sales for the AT&T Personal Computer, the company plans to have its product available in 500 stores at announcement time, 800 to 900 stores by the end of 1984, and on sale in more than 1500 stores by the end of 1985. •

"We have a business plan that was initiated to show a profit in year one and our earliest indications are that we will exceed our expectations," Boyd says. "We didn't necessarily start out with that objective, but the plan we have in place will deliver

“We have a business plan that was initiated to show a profit in year one and our earliest indications are that we will exceed our expectations. We are on the verge of leading the industry.”

—JOHN BOYD



Photograph by Michael Mella

positive return in year one and obviously to do that we need a great deal of volume. However, we don't have to go out and displace all of our major competitors in the first 90 days of our product in production. We are on the verge of leading the computer industry."

Nevertheless, AT&T production goals are a closely guarded secret—"we don't want the competition to know how many we can produce" says one AT&T official—as are unit sales goals. Since IBM won't divulge the number of personal computers it sells annually, the number of units a manufacturer must sell to "lead the computer industry" is open to speculation. But since AT&T's personal computer is manufactured wholly by Olivetti in Italy, the company AT&T bought into in December of 1983 for \$260 million, it is unclear whether Olivetti could deliver enough units to meet a serious demand for them. Indeed, Olivetti unveiled a personal computer of their own two days after the Hanover Trade fair (an international industrial fair held annually in

Hanover, W. Germany). The Olivetti machine is virtually the same machine being exported to the U.S. for sale under the AT&T name—except for a different case and cosmetics. According to Boyd, Olivetti will continue to sell and distribute their personal computer—with the Olivetti name—in Europe.

But the Olivetti connection does do two important things for AT&T and their larger strategy: it gives them a foot in the door in Europe and provides them with an international manufacturing base reputed to be one of the best-run companies in Europe. And AT&T's buy-in to Olivetti (they got 25 percent of the company in return for an agreement not to increase their holdings for four years) assures them of being able to compete for international market share against IBM and ITT's entry into the personal computing marketplace (see review, page 17), behind a marketing strategy built on voice and data integration.

Yet the battle lines for dominance in the personal computer marketplace seem oddly drawn. Indeed, they would seem weighted in IBM's favor since it is the company perceived to

be the keeper of the PC-DOS/MS-DOS "grail." Clearly, the question remains: Why would AT&T bother to introduce an IBM-compatible machine rather than wait for its own UNIX-based product?

"There's no adversity here," says Steven M. Bauman, executive director of AT&T's office information and terminals division. "We already have our UNIX machine (a reference to the 3B line of minis introduced earlier this year). The customers are sitting on top of an investment in software (for personal computers) and we have an open architecture to protect their investment." Says Boyd, "The software is already out there, so for us to come out with a machine that's all UNIX would be a serious marketing mistake. People would wonder about our sanity. We're taking a realistic approach to our marketing efforts. We understand what exists today. We want to take advantage of it. Then we have the ability to offer our customers the best of all worlds. To take advantage of what they've got today ties in with the strategy of protecting their investment and gives them options for the future."



Photograph by Michael Mella

“We’re selling to accounts that have invested in the IBM world. UNIX and MS-DOS strategies are complementary. To ignore the realities would be not understanding the market.”

—STUART MENCHER

Stuart Mencher, director of data systems marketing, heads the division that deals directly with companies rather than retailers. He calls AT&T’s approach a “building block strategy; micro to mini to mainframe.”

“We’re selling to large and intermediate accounts that have already made an investment in the IBM world,” Mencher says. “The MS-DOS and UNIX strategy are consistent and complementary. To ignore the realities of the world would be not understanding the marketplace.”

Mencher sees the personal computer being used in a stand-alone environment as well as providing access to a system and central data base.

“We have an intelligent workstation strategy. A personal computer is nothing more than an intelligent workstation,” Mencher notes. Jack Scanlon, vice-president, computer systems, who heads the group that developed the computer line, believes UNIX will be the bridge among all of AT&T’s computers. Says Scanlon, “Achieving that (UNIX as the operating system standard) is critical to our strategy in the marketplace because our strategy is simple: Build a

UNIX marketplace and come in with the best UNIX hardware.” As Scanlon sees it, UNIX will plug a major hole for companies by “glueing very dissimilar boxes on desk tops to very dissimilar big engines.”

“The key issue in the single-user area,” Scanlon says, “is that with the next generation of chips coming out, you have a real engine. You essentially have a microprocessor that’s got a mini-computer in it. So what you need is an operating system in a single-user environment to take advantage of the kind of bang you get in that micro.”

Since AT&T’s personal computer interface will allow the personal computer to link to the 3B series of mini-computers, AT&T believes users will get the biggest bang from their micros by having a personal computer on their desk with both MS-DOS and a way in which to tie in to a network which uses UNIX.

Says Mencher, “One of the complaints we get (from customers) is they get an IBM Personal Computer or compatible and they come to us and complain that they’re isolated,

they can’t run things together.” Installing UNIX in a personal computer would solve that problem—and a host of others. For one thing, it would allow the user to do multitasking—have several programs running at once on a computer. Not only that, since it is an operating system designed to be machine-independent, UNIX as the industry’s operating system standard would mean that when users were ready to buy other—or another—personal computer, software compatibility would not be an issue. Since UNIX is already used as the operating system on some minis and mainframes, UNIX on a personal computer would mean that the user would be able to access both the mini and the mainframe.

Until recently however, the idea of UNIX running on a personal computer simply didn’t make sense in light of the technical problems to be overcome. An offshoot of Multics, a larger, more cumbersome operating system designed to run Bell Labs computers and a system without the capability to support multiple users, UNIX was born in 1969, the product of Ken Thompson and Dennis M. Richie, two Bell Labs scientists who

were searching for a viable alternative to the by then defunct (as far as AT&T's Bell Labs was concerned) Multics system. In fact, according to Richie, the name UNIX—an acronym with no meaning—was suggested in 1970 by a Bell Labs scientist, "... in a somewhat treacherous pun on Multics ..."

Says Richie, "UNIX will need some improvements before it can successfully reach the desktop level." For one thing, he points out, "UNIX has grown enough so that it's fairly difficult to squeeze it back down into smaller machines. I'm sure that things will have to be put on top of it to make the (user) interface different." Scanlon concurs that the system will need modification before it can become, at least for the personal computer user, the operating system industry standard. "... it will be necessary to put a different shell interface in front of UNIX to make it look like something they're used to in the personal computing world rather than the mini world," he says.

But with the new generation of hardware entering into the marketplace—including AT&T's Personal Computer—many of the problems which prohibited UNIX from being

used as a personal computer operating system would seem to have been solved. In the past, one major problem centered on the amount of addressable memory available to an 8-bit processor—which was 64k. The amount of memory needed by UNIX was much greater—about 512k, according to one Bell Labs UNIX expert—which needed a true 16-bit processor to address that amount of memory.

The problem left, really, is the communications channels by which the hardware is linked together, something that AT&T's recently announced PC Interface may overcome. The PC Interface, a hardware-software combination, allows the linkage of several personal computers through a central minicomputer, use of the minicomputer's data bases and other resources, access to AT&T's 3B Net, an Ethernet-compatible local area network, and access to 3B's Electronic Messaging System (AT&T's Videotex system). According to AT&T executives and technical staff, the PC Interface performs all the necessary translations to allow moving files between the UNIX operating system and MS-DOS.

But perhaps a more significant

announcement centers on the introduction of the AT&T Context Switch, a piece of software designed to allow their Personal Computer to be used as a terminal with the 3B series of minicomputers. With the Context Switch, a user will be able to retrieve data from a 3B computer and, by pressing a few keys, switch back to the MS-DOS environment.

Communications hardware will no doubt fill some of the empty slots in the AT&T personal computer. A future communications device may also fill AT&T's version of a "mystery slot"—an empty 32-pin socket located next to the asynchronous communications chip on the motherboard, the main board of the computer. AT&T executives would not disclose what that particular socket is for, but there have been hints that it might have something to do with serial port-based networking, perhaps a low-cost version of the PC interface.

One report from inside AT&T is that an "options board" will be made available by the end of 1984 or early 1985. That board, reportedly in prototype form now, would allow a telephone to be plugged into it and allow the computer to manage (autodial, tracking, etc) telephone communications, what AT&T refers to as "voice management."

"All of our strategy is to include voice and data," says Larry F. Dooling, executive director, general products and systems division. Says Scanlon, "Digital processing of voice is something we kind of wrote the book on, so I think you would expect us to bring that kind of dimension to the business."

But there is another way to move UNIX into the personal computer environment and that is perhaps the simplest way of all. It is to put UNIX onto the processor chip. AT&T itself is a major player in the chip business.

WHAT'S IN A NAME?

In an industry of well-guarded secrets and cutthroat competition, computer hardware and software developers often give their projects code names. The working title for the IBM PCjr, for example, was "Peanut," and the Hewlett-Packard 110 went under the code name "Nomad," while dBASE II was referred to by Ashton-Tate insiders as "Trinity."

During its development stages the AT&T Personal Computer was code-named "Safari III." The name is reported to have come from inside Bell Labs while several senior executives were on safari. Another theory on the origin of the name is that the frequent trips by the computer's developers to outside vendors in California gave rise to the name "Surf and Safari," later shortened to Safari.

Of course, some products never outgrow their code names, and go into the world with the often cryptic labels given to them by their creators. Examples: the Apple Lisa and the Macintosh.

The U.P.S. and Downs of Business



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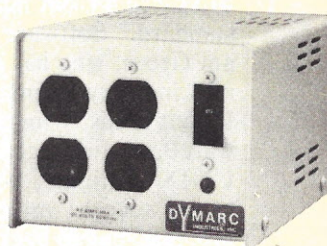
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*based on IEEE data.

Chip technology—and cost—are not static, and according to Scanlon, the market will have all the chips it needs within 12 months.

AT&T officials claim that every major chip maker is currently working on putting UNIX on the processor chip. Some AT&T technical sources say there is no longer any "real technical reason" to prohibit UNIX from running on a stand-alone personal computer.

AT&T is aggressively seeking "value added" software developers to translate their existing software onto a UNIX operating system. According to John R. Rowley, president of Digital Research, Inc., "It's the most aggressive third-party software (recruiting) movement I've ever seen." Digital Research, Inc., (DRI) has been chosen by AT&T to publish the UNIX standards, providing one route to the market for software vendors.

"I think the UNIX market is going to take off," says Mencher. "We're going to have one UNIX standard to allow vendors to write packages but that's not going to happen overnight."

Not every industry watcher agrees with Mencher's assessment. Says Richard Ross, an analyst for the Gartner Group, "I think (UNIX) will catch on, but not be the de facto standard." Software distributor Adam Green, who has made a training aids industry (primarily for dBASE II) out of his Arlington, Mass., SoftwareBanc firm, geared up to offer UNIX seminars, books and videotapes several months ago—then promptly pulled back. "It just doesn't look like it's going to be as popular as we first thought," Green says.

Nevertheless, it is interesting to note that a licensed version of UNIX is already supplied to IBM by Interactive Systems of Santa Monica, California. Known as PC/IX, it became available through IBM Product Centers in late April—considerably after

IBM's original January announcement. IBM is supporting it primarily as a multitasking system for single-user business applications—although a company spokesman did indicate recently that it is possible for experienced programmers "who can keep their files straight" to handle multi-user PC/IX applications. The same spokesman also noted that the system's multitasking capability is a dimension that PC-DOS cannot offer to IBM Personal Computer users.

UNIX is already a \$260 million market (in 1983) and industry watchers predict that by 1987, it will reach \$2 billion. The sheer momentum of a market that size would seem to assure it some kind of success.

As to IBM's anticipated reaction to AT&T's entry into the personal computing market, Dooling says he does not view IBM as a reactionary company. "I don't know that IBM will respond, per se. I think IBM has anticipated for some time how they will differentiate themselves in the market. I think they see UNIX as a much more critical issue.

"We have the potential to displace IBM but IBM has been in that game for a long time. We're a principal alternative to IBM. We want to be the vendor of choice. We're marching into an environment where people want to tie (computers) together over time. We offer an easy transition," says Dooling. "It would be arrogant of us to go into the marketplace and not protect the customers' investments. Customers will be pleased that we did not feel we should ignore the money they already spent. We're not looking at first-time users of personal computers."

According to AT&T's Boyd, his retail group is targeting the personal computer at both segments of the market, "however, our primary interest initially is the new user and most

of our marketing effort from an indirect standpoint will be aimed at the third-party retailer. It is this brand new user of personal computers who is most likely to be shopping at retail stores.

"Three-fourths of all potential users today don't have a personal computer and I believe that over the next 12 to 18 months at least one-fourth of those potential users will be making personal computer decisions. I think the potential end user will look at all of his options and say: 'which one makes the best sense for me?' and 'which organization represents the best computer strategy for me to take advantage of, so if I see an organization that's citing flexibility, reliability, communications capability and protection of my investment, I think that's the reason you make a decision. You don't worry about whether it looks like something else.'"

Apple is clearly gearing its near-term strategy to capturing this second wave of new users, and is launching a two-pronged attack with the Apple II family and Macintosh.

Having repackaged its Apple II into the compact IIc, Apple looks to use this product to gain dominance in the high-end home market, as both Commodore and IBM are currently floundering. More problematic are the future prospects for Apple in business markets. Here the company's hopes ride on Macintosh. In a bold move, Apple alone among the major players has turned away from PC/MS-DOS in an attempt to set its own standard. Whether the move will work depends in part on whether a strong software base evolves for the current Macintosh, and whether the next generation, the 512k Macintosh, will overcome performance limitations of the first version. Apple has also turned back to its retail outlets, having squandered time and effort fruitlessly in attempts to sell directly to Fortune 1000 companies.

IBM entered the home market in

Photograph reproduced with permission of AT&T



“We intend to be a leading provider and integrator of business office automation systems that enhance voice, data, office, building, factory and network management.”

—JAMES E. OLSON

November 1983 with its long-awaited PCjr, which has been anything but a resounding success. But that home market is one AT&T is choosing to ignore, at least for the moment. So while IBM and Apple are strongly marketing their business and home machines, AT&T is entering the market with a personal computer aimed *only* at business.

“I think we are viewed today as very strong in the corporate environment,” says Boyd. “We relate best, perhaps, to the Fortune 500, and others, and an individual end user probably doesn’t have a great deal of experience in dealing with us and doesn’t know what wonderful people we are. Surely if they got to meet me and Dick (an associate) they’d buy tomorrow. But we can’t obviously meet all of them and we haven’t had that opportunity over the last 100 years. So that’s a conscious part of our merchandising plan.”

This merchandising plan encompasses an “impressive, expensive campaign” to support the retailer and value-added resellers. “I think it will rival any advertising campaign and I don’t say that as a marketing statement. I think it’s going to substantial-

ly change the image of AT&T.”

Still, the criticism of AT&T’s marketing ability persists, both inside and outside the industry. The image that needs to be changed may not be that of a company known for its technological and manufacturing excellence. As Gartner Group’s Ross points out, “I’ve heard people say they’d buy just because it was AT&T.” The ‘image-changing’ work that may need to be done is that of a company able to successfully market products.

So how bold a move is it for AT&T to move into the market with an MS-DOS personal computer rather than waiting for UNIX? It comes back to marketing strategy, an interesting switch for a formerly technology-driven company, since the personal computer decision clearly was a marketing one based on the enormous installed base of PC-DOS/MS-DOS software.

Can AT&T pull it off? On the day after the announcement the personal computer is slated to be on sale in about 500 stores. There are approximately 3500 computer specialty

stores in the U.S., according to Future Computing, the Texas-based company that certified the Olivetti Personal Computer (i.e., the AT&T) IBM-compatible. There are currently some 1800 authorized Apple dealers and approximately 1400 authorized IBM Personal Computer dealers. AT&T executives claim they can import enough personal computers from Olivetti to keep up with sales. Its promotion campaign promises to be heavy and highly visible. Nor does the company see the lack of one, highly visible “person in charge” (IBM has Philip Estridge, Apple has Steve Jobs, etc.) as hurting its efforts. The sheer size of the big two (AT&T’s 1983 sales were \$64 billion; IBM’s 1983 sales were \$39 billion) is staggering. In the background, of course, waits the other potential force, Japan.

So the questions for time to settle are: Does the world *really* need another IBM-compatible? Will the American consumer buy AT&T’s integrated office approach to personal computing?

And perhaps, most importantly, what will the other “giant” do while all this is going on? 

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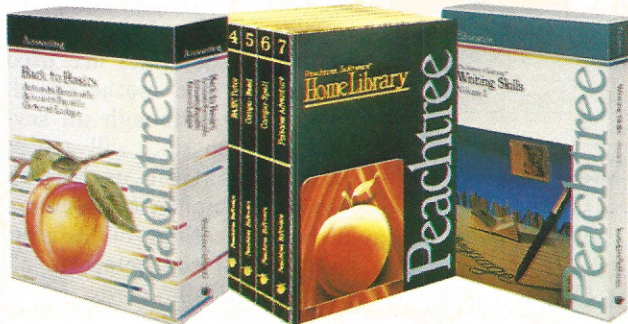
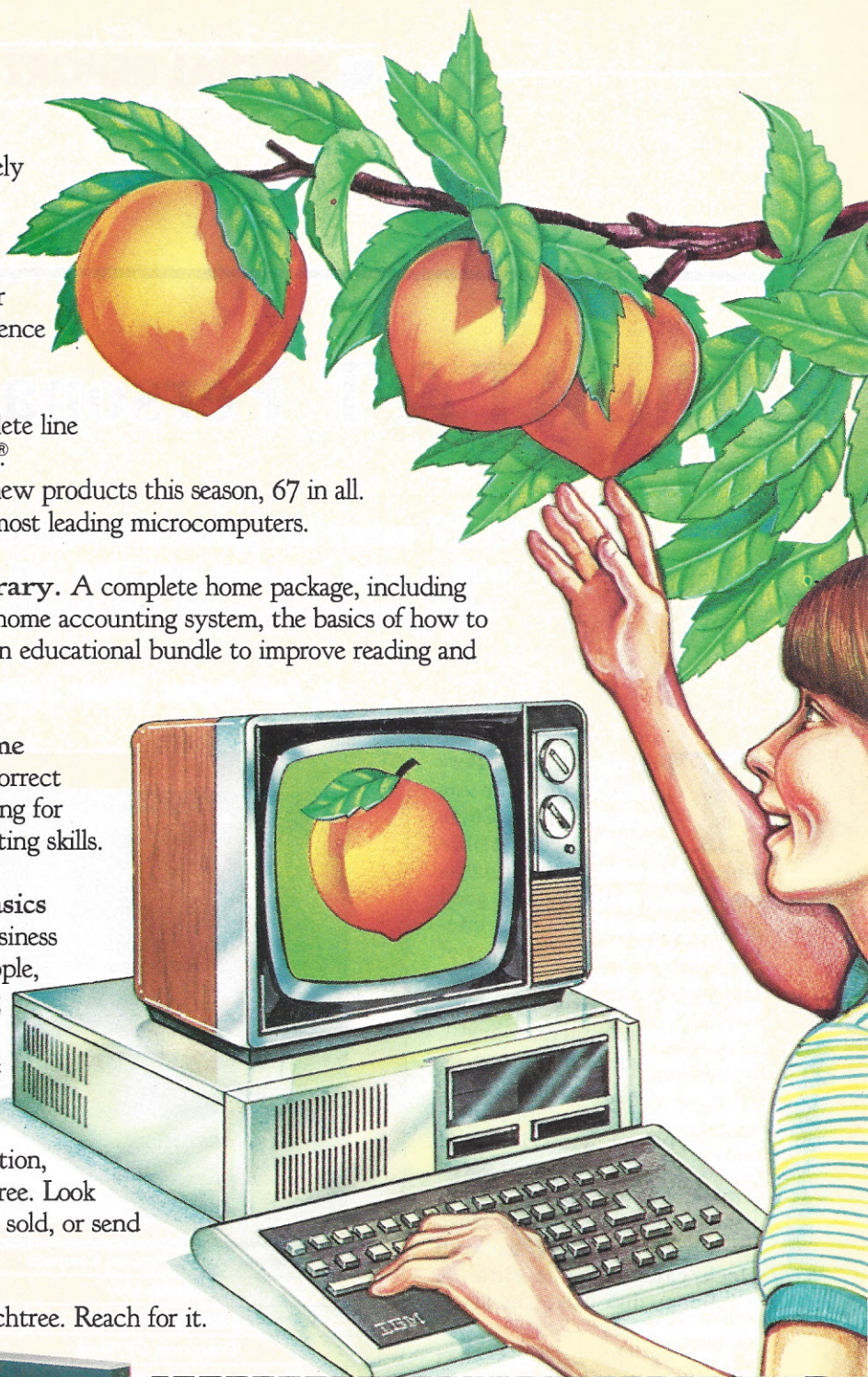
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The AT & T Personal Computer

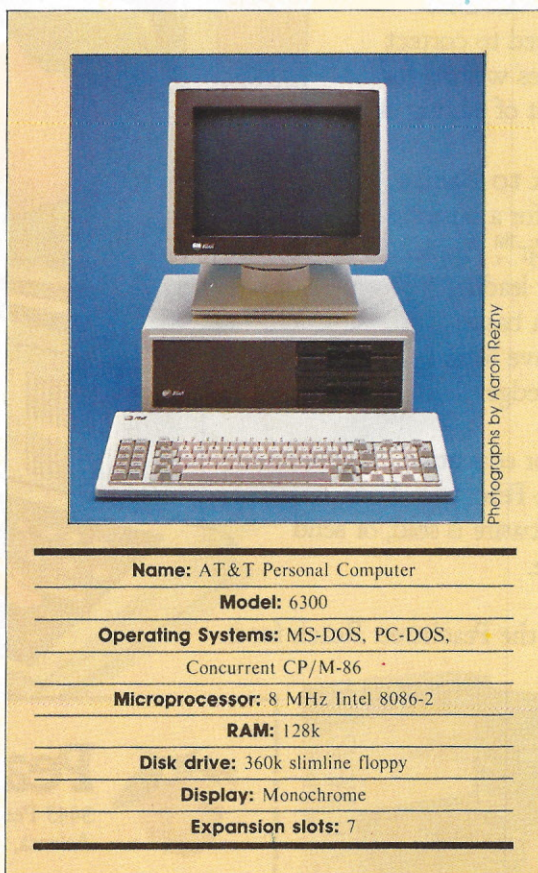
AT&T enters the personal computer marketplace with a solid business machine that incorporates high processing speed and intelligent design

by Paul Bonner, Senior Editor

The new AT&T Personal Computer introduced June 26 is an IBM-compatible which features high processing speed, solid design, good graphics capabilities, and integration with the AT&T line of mini and supermicro computers. AT&T imports it from its Italian manufacturer, Olivetti, which markets it in Europe.

In its basic configuration, the AT&T Personal Computer will be equipped with 128k of RAM, parallel and serial ports, a monochrome monitor, a high-resolution color graphics video interface, a battery back-up clock/calendar, one slimline 5¼" floppy disk drive and seven expansion slots.

Among the options that AT&T has announced for its Personal Computer are expansion up to 640k of RAM (on the motherboard), a color monitor, an additional floppy disk and an internal 10Mbyte hard disk. An expansion box for hard disks of up to 50Mbyte capacity with streaming tape back-up will also be available, as well as Ethernet and Omninet interface boards, AT&T's own PC Interface network interface, a Z8001 co-processor, and an 8MHz 8087 math co-processor.



Photographs by Aaron Reznay

Name: AT&T Personal Computer

Model: 6300

Operating Systems: MS-DOS, PC-DOS,

Concurrent CP/M-86

Microprocessor: 8 MHz Intel 8086-2

RAM: 128k

Disk drive: 360k slimline floppy

Display: Monochrome

Expansion slots: 7

Processing speed

The AT&T Personal Computer is powered by Intel's 8086-2 microprocessor. This chip uses the same instruction set as the 8088 used in the IBM Personal Computer and most

IBM compatibles, but because it is a true 16-bit microprocessor and runs at a higher clock speed than the 8088, it allows the AT&T Personal Computer to execute programs 30 percent to 80 percent faster than the IBM. In our tests, it ran such "compatibility tests" as Microsoft's Flight Simulator and Lotus 1-2-3 nearly twice as fast as the IBM Personal Computer. (For a full explanation of the differences between the 8086-2 and the 8088, and the results of benchmark comparisons of the performance speed of the AT&T Personal Computer and the IBM Personal Computer, see "How Fast Is It?", page 76.)

The system architecture of the AT&T Personal Computer reflects its use of the 8086-2. Sixteen-bit datalines are used throughout the motherboard. In addition, although all seven expansion slots will accept IBM-compatible expansion boards (which are based on

8-bit technology), three of the slots also have special connectors to allow the use of 16-bit cards, which should enhance the performance of the AT&T Personal Computer in applications such as high-speed networking.

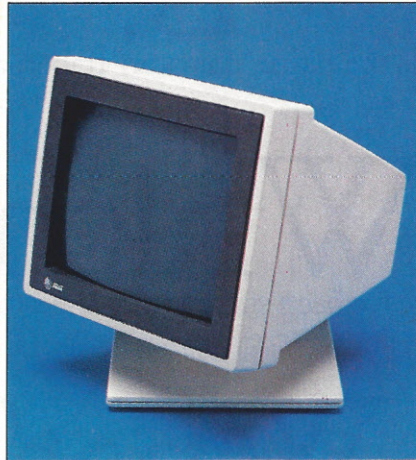
Styling

Generally, the AT&T Personal Computer is an attractive and intelligently designed system, both inside and out. The system unit is small—15" wide by 16.5" deep by 6" high—closer to the size of an Apple II than the IBM Personal Computer. The front of the system unit features both a green "power-on" indicator light and a reset button that initiates a complete hardware reset, including a complete run-through of the power-on system diagnostics.

The unit we saw was equipped with a monochrome monitor on a tiltable, rotatable base. The monochrome monitor has a single cord which connects to the video display interface on the system unit. It receives both video signals and power through that cord. The optional color monitor will have a separate power cord.

The keyboard, which has a responsive feel, is virtually identical to the IBM Personal Computer keyboard, with function keys on the left and a numeric/edit keypad on the right. There are LEDs on the numbers-lock and capitals-lock keys. The back of the keyboard has a socket into which you can plug a mouse.

The keyboard has a 4' cord (about half of which is coiled), which connects to a socket at the back of the



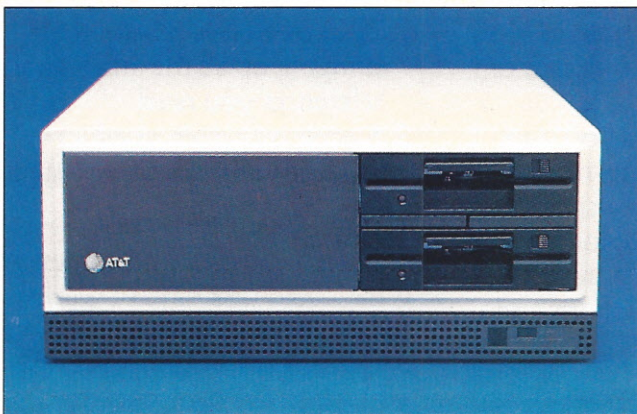
The AT & T Personal Computer's monitor can be tilted and rotated.

system unit. That arrangement doesn't give you as much freedom in positioning the keyboard as does one in which the keyboard cord socket is on the front of the system unit, but due to the length of the keyboard cord and the fact that the socket for the keyboard is near the edge of the system unit, there is half a foot or more of leeway in positioning the keyboard before any tension is put on the cord. In addition, the keyboard-to-system unit connection can be bypassed altogether by plugging the keyboard into a socket on the back of the AT&T monitor. With this arrangement, the system unit can be

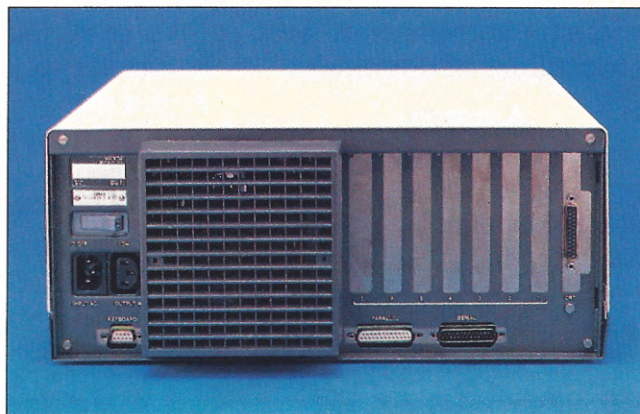
placed on the floor or anywhere within reach of the long cord on the monitor, leaving your desk top clear except for the keyboard and monitor. Plugging the keyboard into the monitor also results in more freedom in positioning the keyboard.

This attention to design extends to the internal layout of the AT&T Personal Computer. Everything in the basic configuration model (i.e., 128k memory, the disk controller, the parallel and serial ports, and the clock/calendar) is included on the computer's main circuit board (motherboard). In addition, you can add many of the options (including up to 640k of RAM, an additional floppy disk, and a color monitor) without using any of the computer's expansion slots. Thus, with the basic AT&T Personal Computer, or even with one equipped with 640k of RAM, a color monitor, and two disk drives, there are still seven empty expansion slots. A similarly equipped IBM Personal Computer would have two empty expansion slots (and possibly less if you do not use a multifunction card in one of the slots).

The 8087 math co-processor can also be installed on the motherboard of the AT&T Personal Computer, as it can be in the IBM Personal Computer.



A slimline 5 1/4" floppy disk drive comes with the AT & T Personal Computer. A second floppy drive or hard disk are optional.



On/off switch, keyboard socket and parallel and serial interface sockets are located at the back of the disk drive.

What?

What is the latest R&D activity in Japan in the field of industrial robots?

Is?

Is the name "datascan" trademarked?

Which?

Which drugs have been successfully used to treat osteoporosis?

What?

What is the current and projected market for frozen orange juice?

Are?

Are there any personal computer user groups for attorneys in the Boston area?

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Which South American companies import electronic components from the U.S.?

How?

How can I find all the orthodontists in Toledo for my direct mail campaign?

What?

What are the mechanical properties of shape memory materials?

Has?

Has the cost-effectiveness of teleconferencing changed in the last year?

Who?

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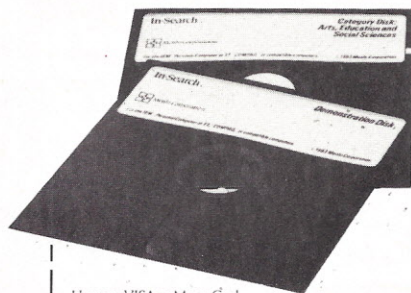
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HOW FAST IS IT?

To the casual observer, the most obvious difference between the AT&T Personal Computer and the IBM Personal Computer is speed. AT&T's new entry executes programs significantly faster than its competitor. In a series of comparative tests performed by *Personal Computing*, the AT&T Personal Computer operated from 30 to 82 percent faster than the IBM Personal Computer. This dramatic difference in performance speed is not a magical matter of smoke or mirrors. It is a logical and direct result of the Intel 8086-2 microprocessor, running at 8 MHz, that AT&T has used in its machine. The slower IBM Personal Computer, and most IBM compatibles, use the Intel 8088 running at 4.7 MHz.

Since a microprocessor's job consists mainly of performing calculations and addressing memory—to either store the results of its calculations or to receive its instructions—there are two reasons why the 8086-2 gives the AT&T Personal Computer such a large performance edge. First, the higher clock speed of the 8086-2 means that it processes instructions and performs calculations some 50 percent faster than the 8088. In addition, the 8086-2 is a “true” 16-bit microprocessor, while the 8088 is what is known as a 16/8-bit microprocessor. That is, the 8088 has only an 8-bit address line, and thus must perform two operations to address a memory location, while the 8086-2 has a 16-bit address line and can address any memory location with only one operation.

To put this theory to task, we began our comparative tests with a couple of programs written in BASIC (which we ran with GW BASIC on the AT&T Personal

Computer and BASICA on the IBM Personal Computer). The first of these was a series of programming steps that determined the sine, cosine and tangent of each number from one to 250, and then divided the sine by the cosine, multiplied by the tangent. The results of the calculations were not displayed on the screen in this test. The AT&T Personal Computer completed this programming loop in 11 seconds. In contrast, an IBM Personal Computer took 19 seconds to complete the loop, a 72 percent difference.

The speed difference was less dramatic when we modified the program to have it display the result of each calculation on the screen. For a loop performing and displaying those calculations for each number between one and 100, the AT&T Personal Computer took 20 seconds, while the IBM Personal Computer took 26 seconds, a 30 percent difference.

Next, we modified the pie chart demonstration program from the IBM PC-DOS disk to automatically draw a pie chart with eight slices. The AT&T Personal Computer took 2.8 seconds to run the program, while the IBM took 4.26 seconds, or 52 percent longer.

We then tested the effect of the AT&T's faster microprocessor on a pair of popular applications programs: Lotus 1-2-3 and PFS: WRITE. Running on the AT&T Personal Computer, it took Lotus 1-2-3 2.6 seconds to recalculate a 52 by 26 worksheet in which each cell other than the first cell contained a formula which multiplied the value of the cell above it or to its left by 1.1. On the IBM machine, the program took 4.8 seconds.

These results range rather widely, but a few conclusions can be

drawn from them. While the AT&T Personal Computer consistently outperformed the IBM Personal Computer, the magnitude of its superiority seemed to depend upon the nature of the task it was asked to perform. For tasks greatly dependent upon calculation and memory-addressing speed, one can expect a 50 to 80 percent advantage in the speed of execution on the AT&T Personal Computer compared to the IBM Personal Computer. But for operations in which screen display and scrolling speed plays a more important part, the speed difference seems to be less: from 30 to 50 percent. For example, the tremendous 82 percent speed difference seen with the large Lotus 1-2-3 worksheet described above would be reduced with a one-page worksheet, since on a smaller worksheet the results of every calculation must be displayed. On the larger one, only about one-fifth of the worksheet shows up on the screen.

To whatever degree, the AT&T Personal Computer will execute any program faster than a computer equipped with a 4.77 MHz 8088. Yet, the importance of this difference would seem to depend on the concerns and computer experience of the user. Is there much difference between waiting three seconds for a spreadsheet to recalculate—rather than five seconds? Perhaps not. The difference, in fact, may be of greater significance as a representative milestone of personal computer technology and those who are shaping it. When the IBM Personal Computer first appeared it was a blindingly fast advance compared to its predecessors. Now a new performance leader is on hand.

—Paul Bonner, Senior Editor

Graphics

The computer's graphics capabilities are impressive. The standard graphics interface provides all the graphics modes of the IBM color graphics adaptor (including 320×200 four-color graphics and 640×200 monochrome graphics), plus an additional 640×400 monochrome mode. This means that it will run any software intended for use with either the IBM monochrome adaptor or the IBM color video adaptor, and that a higher-density 640×400 monochrome mode will be available. All of its graphics modes are faster than those of the IBM, due to the faster overall speed of the AT&T Personal Computer.

The optional graphics enhancer planned for later release will provide color graphics in the 640×400 mode, as well as a more extensive color palette and the ability to display text and graphics simultaneously. (Text and high-resolution graphics can be displayed simultaneously on the IBM only by using bit-mapped text characters, which slows down the text display considerably.) The AT&T Personal Computer appears to have capabilities similar to those of the third-party enhanced graphics adaptors for the IBM Personal Computer, including those from Tecmar, Quadram and Plantronics. Its 640×400 resolution (a total of 25,600 pixels) is higher than that of the Texas Instruments Professional (700×320 for a total of 22,400 pixels). But by making this color mode available only as an option, it seems less likely that AT&T will be successful in attracting support for it from software developers (for the same reason that the 640×200 monochrome mode on the IBM Personal Computer has largely been ignored: software developers want to add color or shading to their programs).

Integration and communication

AT&T is providing a number of ways



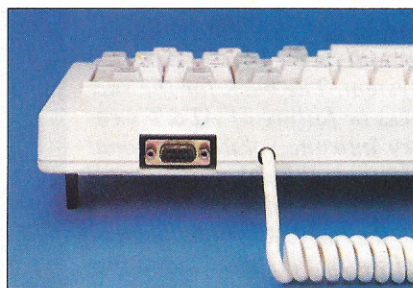
Rear view of monitor shows socket for connecting mouse.

for its Personal Computer to communicate with other computers in the AT&T product line. These include both a software option called Context Switch that allows you to use the AT&T Personal Computer as a terminal for the 3B series of minicomputers. With this software, a user can exit MS-DOS to retrieve files from a 3B computer, then return to the MS-DOS system to work on it—all in a matter of a few keystrokes. In addition, a hardware/software option called the PC Interface allows the AT&T and other IBM compatible

computers to be networked through a 3B5. There are also Ethernet and Omninet interfaces for the AT&T Personal Computer. Additional communications functions are a good bet to be on whatever is made available in the future to fill what is now an unused 32-pin socket next to the asynchronous communications chip on the computer's motherboard.

AT&T also expects to offer a full range of peripheral cards which are being developed with third party hardware manufacturers.

All in all, the AT&T Personal Computer should serve well as both an alternative to the IBM Personal Computer and its compatibles, and as a component of AT&T's plan for an integrated office information system. It's a solid machine that should be considered by anyone in the market for a professional quality personal computer.



The keyboard has function keys on the left and a numeric/edit keypad on the right. Four-foot cord connects to the back of the keyboard (inset).

Jack Scanlon

On AT & T's UNIX Strategy

An interview with the man behind AT&T's UNIX operating system and new line of computers

Jack M. Scanlon is a "heavy hitter." As vice-president, computer systems, in the AT&T Technology Systems Group, he has responsibility for AT&T's new line of computers—from the just announced 6300 Personal Computer to the 3B series of superminis—as well as the UNIX operating system. The buck for the success or failure of AT&T's entry into the volatile personal computer marketplace, will stop on Scanlon's desk.

Recently, Charles Martin, editor of Personal Computing magazine, and Ernest Baxter, the magazine's managing editor, went to Lisle, Illinois, to visit with Scanlon in his spacious suite of offices. The conversation provided an in-depth look at AT&T's market strategy, as well as a point-by-point explanation of how this American giant plans to become a significant player in both the hardware and software industry. *Where does UNIX stand now, and where do you see it going?*

Scanlon: I think you are going to see UNIX as the key operating system by the mid 80s—it's already listed in most people's analysis as #2 behind MS-DOS. It's where most people are



targeting their futures. It's not #2 by boxes (computers)—CP/M still outranks UNIX—but it's going to get there. Achieving that is critical to our strategy in the marketplace because our strategy is simple: build a UNIX marketplace and come in with the best UNIX hardware. That's it.

How will you achieve that goal?

Scanlon: To see how that's happening right now you have to look at various

parts of the market. Take the market we just entered—the reseller market—the guy or the company who's got a market and a software package for it. One of the things he deals first on is margins. Second, his price performance position is determined a lot by how the box he is shoving down that channel with the software compares to the other guy's box. And with the rate at which technology is moving, one thing that really concerns him is, "If I think your box this year is best and I make all my software investment in your box, with all you crazies doing all the stuff in chips, next year's box could be somebody else's. It could be IBM, it could be Fujitsu, it could be Hitachi." With UNIX, he starts to get independence.

For the most part, his investment is in software and now he can independently select the best target. So supportability across a broad range of hardware is important. UNIX supports 70 different makers and the client can pick the best margin, and the best for price performance.

The second reason you are starting to see UNIX go is the independent software vendors (ISVs), the guys

Photograph by Douglas Kirkland

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who are writing the VisiCalcs and the VisiOns and Lotus 1-2-3s. Fundamentally, they're driven by one thing, and that's number of boxes—"How do I get the maximum volume out of my effort?" These companies are small companies. A big software company like Microsoft or DRI is \$50 or 60 million, most of them are under 10, so if they don't pick the right box, they die. What UNIX gives them is, "I write for UNIX, I don't write for a box and I get it on all the boxes that run UNIX. I get tremendous scope of market without ever having to make a hardware choice." That's why the ISVs like it.

The end user is slowly starting to get the message but it is going to take a little longer. He likes the idea of hardware independence because a lot of big end users have large software staffs and that is a big investment once they start pouring their software staff on one guy's box. The other thing end users like larger companies are faced with is, "I've got everybody out there buying these different boxes." Now there is some guy in that company who has the job of tying them all together, and generally he reports to high levels. He is starting to worry because he knows if all those different boxes start appearing on desks, he's not controlling how they are bought. All of a sudden—it's, "Why do we need you when all those guys who go to Computer World can buy a box and we don't need that great big computation center with all the glass windows any more." So what's he going to do? He is going to react, and he already is, by trying to gain control again. He is going to start setting standards. He will buy boxes with certain characteristics. He is going to be assigned the job of tying those boxes together with those big engines where generally the corporate data base sits any-

way. He is looking for a way to glue very dissimilar boxes on desk tops to very dissimilar big engines. And UNIX fits like a glove there—it's the only operating system that runs the micros up to maxis.

What about the concept of personal computers tied into the corporate mainframes? Aren't they doing that right now by downloading data?

"Knowing technically how to do it without being able to put it on a chip is not going to make it useful to the masses. You've got to be able to influence the silicon in the box."

Scanlon: They are, but I think you are going to find the Holy Grail is, "How do you make the thing on a desk work with the thing in the back, other than just pass files back and forth?" I think UNIX is really one of the only hopes of doing that.

Where will the resistance to UNIX come from?

Scanlon: First, on the low end. UNIX still has some problems to get fixed. Because of that, UNIX is perceived to be not very friendly at the low end. We have corrected a lot of those problems with the 3B2 and we'll be announcing releases that make it friendlier and friendlier. Everytime somebody says, "UNIX isn't friendly" I say, "You're right, and we've got to fix that." It's putting a different shell interface in front of UNIX to make it look like something they're used to in the personal computing world rather than the mini world.

All the other operating systems have problems that have to be fixed if they are going to move to the next

generation of desk tops. I think UNIX is in fantastic shape for that.

(Another) area of resistance will come from hardware vendors who don't like the idea of an operating system that runs on everything but the kitchen sink, because they lose a hook. "You buy my box because I solved your problem and a lot the way I solved that problem is with my soft-

ware. If I let you go to an operating system that says you can buy the software independent of a box, my hook into you has just gotten a hell of a lot less than it used to be." But that's not going to be a hold up. The customer is going to insist on it.

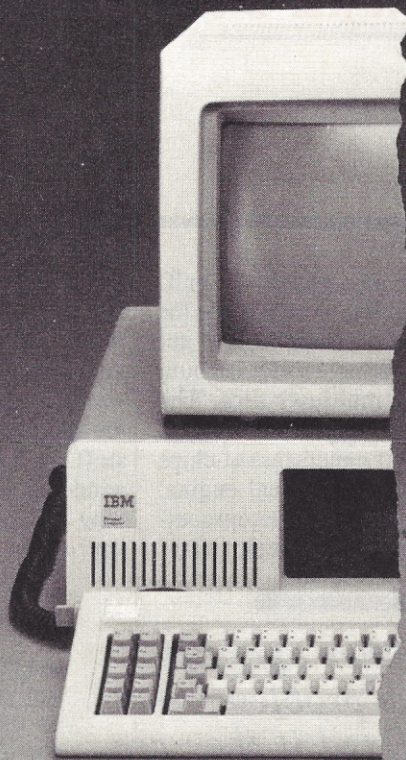
Do you foresee any resistance from the small business user?

Scanlon: As long as we make it a friendly system that can be on a desk, I don't see any resistance. Clearly, it's got to be priced so it can't cost you any more than any other desktop

operating system. That means the amount of memory and everything else has got to be cost effective.

What are your competitors doing to combat UNIX?

Scanlon: Well, most of them are supporting some version of UNIX right now. Give me a competitor and I'll tell you what they are doing. IBM announced PCIX and that's based on System 3, DEC has Ultrix which is based on a System 3 derivative. Apple has nothing so far. Hewlett-Packard supports a version of UNIX, Radio Shack is another one that has nothing so far—almost all of the Japanese vendors are doing something on UNIX. Fujitsu, Hitachi, NEC. Generally what they are doing is taking a UNIX license and modifying it with some bells and whistles. Since we don't license the trademark, they can't call it UNIX. We're the only ones who can call it UNIX—and provide it that way. They're going to push UNIX and then we are going to compete on who's got the best price



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And you think you can beat your competition in that area?

Scanlon: If we can't build the best UNIX engines, there's something wrong with us. And that's where our whole focus is, in that market pitch. We have vertically integrated silicon that's being designed specifically to support UNIX. See, that's a real asset we have that some of the others don't. We don't have a big installed base out there for any 27 operating systems or 64 languages that we have to protect. We can line up all our assets right down to the guys moving the molecules around in the chips saying, "You make it a good UNIX machine, that's your whole objective in life, plus distinguish yourself for very high uptime." So we ought to come across to the customers as the best UNIX system vendors with price performance support, and high uptime, because that's the tradition that we bring, and finally communications. Our stuff should talk with each other—that's where we are trying to position ourselves.

Where do you see the hardware fitting in? You've just entered with this whole line of computers; where do you see that coming in and where do you see that going?

Scanlon: Well, we position ourselves now with half a million fully equipped boxes to play in, and over time we expect to move that up and down. All with the same version of UNIX and with the boxes highly optimized for UNIX. The market we've built so far for UNIX is fundamentally minis down to multi-user desktops. Where we have to take it next is single-user desktops.

By single-user desktop, do you mean a personal computer?

Scanlon: Yes, a personal computer. This multiuser versus single-user thing—something's going to shake it-

self out over the next year and a half. I think there's going to be a place for both of them, so it's important to get UNIX in both places. UNIX is going to dominate the multiuser area. The key issue in the single-user area is that with the next generation of chips coming out, you have a real engine. You essentially have a microprocessor that's got a minicomputer in it.

"All the other operating systems have problems that have to be fixed if they are going to move to the next generation of desktops. UNIX is in fantastic shape for that."

So what do you need in an operating system in a single-user environment to take advantage of the kind of bang you get in that micro, plus the memory management unit that comes with it, plus the demands of the applications people? You have to have a multitasking operating system. It's highly likely a lot of those things are going to be tied to something else—that's another reason you are going to need multitasking. The third reason is that the interface between the body sitting in front of the boob tube and the boob tube has got to change. You are already starting to see windowing, mouse, keyboard—the only thing you aren't using now is your feet and that will come next. Now sit back, you're at an operating system right at the desk top, what do you have to do? First you've got this big engine, which can now take very sophisticated applications that used to run on minis, and put them on your desk. Second, you have to be able to deal with a network and many things

going at once—if I'm going to keep five windows busy in front of this secretary, let's not do word processing anymore, let's do page processing. I want to see five pages at once, move paragraphs around, text edit—that stuff. So I would have to handle five windows, I got a mouse that's running around over there, I got a keyboard and I don't know, maybe I'll figure out how to use my foot.

Guess what you have? You have a multitasking operating system and that's the other reason you are going to see UNIX on that desk top.

But do you still see an environment where you have multiusers connected to a central processing unit, a mini with five or 10 users and a separate, individual working station?

Scanlon: Definitely. But you are going to see individual workstations no matter what you do.

But you are also going to see that single-user workstation tied to something else. I mean if I can prepare all of these documents in front of me and get all my engineering drawings in this boob tube, why do I now have to get them printed out to take them over to the factory or the Xerox machine or the whatever to move them around? So there's definitely going to be a long market for single-user workstations, but they are going to be communications-tied as well. I see the multiuser end going two ways: One is you'll have less sophisticated users who don't need all that in front of them and can get away with simpler boob tubes. And why not? In a multiuser system, you share all those expensive resources, and a fairly simple tube to do 99.9 percent of what they need to do.

The other Holy Grail is in the network. Where is the intelligence in this thing? It's either in the interfaces, and you are going to spend money on every interface to do it, or you are going to put a box down there some-

where to act as the network intelligence, the gateway to wherever you are going, and share the expensive resource. One or the other is going to happen, and I am convinced multiuser systems are going to play a big role in networking single-user stations.

Do you think they will just tie in and out as need be?

Scanlon: I think it's economics again—economics and how big you want your desk to be? I drop my personal computer on my desk and as I get more and more sophisticated applications, I have to start adding stuff to it: a hard disk, a printer, a nicer boob tube. It's getting awful crowded there, and it gets to be pretty expensive. Pretty quickly you have a \$6000 or \$7000 system and you say, "Why don't you use the hard disk over there, or we'll all use it, plus we can all connect to each other this way so you can talk to me and I can talk to you and we can gateway to the system data base." Economics are probably going to drive you to it.

What else is AT&T doing to support UNIX?

Scanlon: We've got Ashton-Tate to work with us to support our software—port their software to our boxes—and a distribution arrangement to go with it. We're doing it now with a whole bunch of companies—the popular and oldest applications. With Digital Research we're going to work together to produce a broad UNIX library of business packages and engineering/scientific packages that run not only on our stuff, but on anybody's. The DRI venture is specifically toward UNIX and not just 3Bs because our intention is to continue to treat this as a full-blown product.

What about Olivetti?

Scanlon: All we have so far is a hardware arrangement with Olivetti

where they distribute our products in Europe. The key territories are the United Kingdom, France, Germany and Italy.

It's rumored that any AT&T single-user workstation would use 3½ inch disks.

Scanlon: The reason you heard that rumor is that there was a lot of activity in the early days of 3B2 of looking

"I think you are going to see UNIX as the key operating system by the mid-80s. It's where most people are targeting their futures."

at 3½ inch disks. In fact, we've got models running with 3½ inch drives inside the laboratories. The reason we decided not to come out with 3½ inches is we thought it was fundamental to be compatible with the 5¼ inch marketplace, and 3½ inch isn't compatible.

Do you see that changing over time?

Scanlon: I think it will. There are some real assets, as you know, with a 3½. You've got a harder floppy, more robust, higher density. I think it's going to happen and we can go to it lickety-split.

Isn't it a big deal to change over?

Scanlon: Not for us, we've already invented both ways—it's a marketing issue. It's going to be inevitable because it's such nice technology, and one of the lessons you learn in this game is good technology, stuff that's really good, is going to have an impact because eventually the market will come around to it. So it's going to happen.

What are some other technologies

you would put in that category of good technology that you think is going to come around?

Scanlon: Well, I think windowing is going to be the standard in a year or so. The reason is that it opens the band width up between the person and the computer so much. I think another thing that's probably a couple of years away—people know how to do it now, but not very well—is voice, like voice mail. That's something you ought to have. The reason you don't have it now is that it's too expensive, and the reason it's too expensive is that you don't have the custom silicon to support it. You'll see the custom silicon in a couple of years.

What about the portable computer market?

Scanlon: The portable thing is going to happen, but I think for them to be useful they have to look like an extension to the computer you use in your business. You don't want to change gears.

The really useful portable in the business environment is going to be something that has 100 percent compatibility with that thing on your desk, and can act as a remote terminal. In other words, if I can take my portable and plug in the phone jack in my hotel room to it, dial up either my desk or my office computer and have the portable now look like a remote terminal for the office computer, then I'd think I had something useful. I don't think it is completely ridiculous to suppose that UNIX is going to play a role in a portable and the useful portable, quite likely just for compatibility reasons, might even be 32 bits. Now a lot of people ask, "How can you afford that?" It's two chips and the price of a chip is the same no matter what's on it—determined only by its die size—we'd even put New York City on a chip. If you tell me how big it is I'll tell you what it costs. And so I think portables be-

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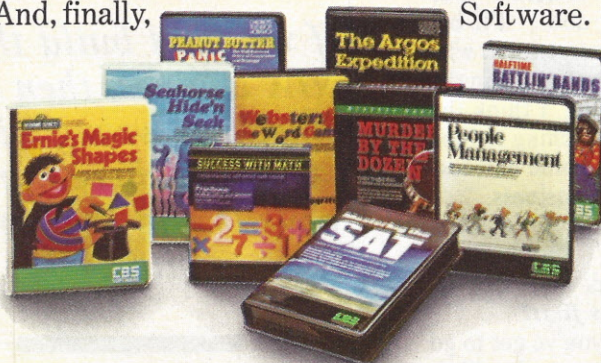
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come useful when they become more compatible with the next thing up—when you can communicate with the next thing up.

The home computer thing is another one that I have doubts on, but I admit a lot of ignorance. My guess is that if you went to a retailer who sells a lot of home computers and said, "Give me your customer list for four months ago," and run around and ring door bells and just ask one question—"Where's your home computer now?" I'll bet you get a high percentage who say it's in the closet or it's in the cellar or something. I think the market is still searching for the right need in the home business and the portable business.

Do you see AT & T in those markets?

Scanlon: Oh sure.

Which market is first?

Scanlon: I think you've got to go in both directions—the high end and the low end. Today's context of what everybody thinks of what a personal computer is, I think is pretty low on the stick, so we've got to solve that problem. So we definitely get into that market to simply count customers. On the other hand, if you count money per box, it's up.

When you enter the personal computer market, you have to compete with an incredible amount of programs that people have right now on MS-DOS and Apple DOS and so forth—how do you get in fast enough to get market share?

Scanlon: That's an issue and it's a critical one, because the people writing those programs, as we discussed before, are motivated by numbers in account boxes. That's what makes them write because their margins are thin, they have to do it that way. So that's another fundamental tenet behind our UNIX effort—get UNIX on those boxes and get volume. We are doing a lot to stimulate that with micro vendors because all of the mi-

cro vendors are now doing ports to UNIX—Intel, Motorola, Nashville, Zilog—and that's critical because the next generation of desktops and portables will have all those chips in them so they'll come with UNIX. That's one thing we do. The second is deals with DRI and other software companies and we'll have to continue to do that until it's clear to every ISV

"If we can't build the best UNIX engines, then there's something wrong with us. And that's where our whole focus is—in that market pitch."

that, "my choice is write UNIX System 5."

Will I be able then someday to just go and buy a board and stick it in my IBM and have it support UNIX?

Scanlon: It's not a bad idea. A fundamental tenet of our whole strategy is that we understand how many companies are out there—very capable companies, not necessarily very large companies—who can add value to our products—software companies, board companies, peripheral vendors, hard disks, floppy disks, streamer tapes, SNA interfaces—our approach is to have a completely open architecture. We want all those cats working on our stuff. So I think your hypothesis is a very reasonable one and somebody who is a board banger-out, knows something about UNIX and how to go about it, will go after that one early on. And there are lots of other things they can do. We're doing everything we can to stimulate that infrastructure and so far it's been pretty successful.

An operating system is not something a lot of companies ought to go to work on. First, they are very tough to do, there's a zillion more failures than successes. If you've got a good one, then you ought to standardize on it and you ought to concentrate on anybody who has something unique to contribute, like an applications package for a vertical market. I claim the small box business is going to be a commodity and the reason is that over the next three or four years, as the number of components per chip per year is doubled, to be in business you had better have enormous volumes because the capital requirements for that chip business are astronomical.

Doesn't that eliminate almost all of the makers of personal computers then?

Scanlon: If I was somebody out there that didn't have vertically integrated silicon in the com-

pany, and the capital assets, I'd think seriously, "Why don't I buy a box and give my value added with something that I can do—an applications package for a vertical segment?" because it's just not going to support too many players. It's simple economics.

When will that start to happen?

Scanlon: I think it's starting to happen now. Let's just go back and look at silicon fundamentals. The new 32-bit we announced three weeks ago—180,000 transistors on a chip that's about one-half centimeter—is about where you want to be for high yield. Next year, those physicists are going to go back like clockwork and say—guess what, we got a .8 micrometer thing, now you've got two choices, designer: Do you want to cut that chip down to a quarter of a centimeter and get your yields up high—or do you want to spend more transistors in the same size? I'll give you 300,000 transistors, but what are you going to put on there? You're sucking all the stuff out of that personal computer onto a



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few chips. But to do that you have to have a whole bunch of skills—you've got to have the architectural skills, super silicon skills and circuit-aided design skills and you've got to have enormous volumes because that business is so expensive.

But that means you are talking about selling enormous volumes of personal computers?

Scanlon: Or chips if you are a silicon company.

But you're not a silicon company, are you?

Scanlon: Yes. Right now all we do is sell ourselves, but you know our intention is to sell silicon on the outside as well. You are going to be buried in chips in about a year by everybody. Why?

Scanlon: Well, because it's a feast or famine phenomenon. The chip business is enormously expensive—a white room is \$118,000,000. It's going to last four years and then you throw it out. So you had better have lots of chips to sell or you are going to go broke day one.

What about the technologies like Apple's Macintosh, which everybody claims has the ultimate user interface. Supposedly they're selling like hotcakes across the country. What makes the base go away from that once you come out with your competitive box?

Scanlon: It gets down to how many key players you think there are going to be. Apple certainly has been a player from the beginning with very unique products. IBM is certainly going to keep playing and AT&T is going to be in there with UNIX. The only missing element in there is the Japanese and the only reason I don't think you have seen a major Japanese entry is because they are still looking for a distribution channel.

One criticism of AT&T is that it doesn't have distribution channels for its products.

Scanlon: The channels that exist today and have been utilized for years are channels to the telecommunications business with seven regional sales offices. The new channels we're just setting up are for value-added resellers and they will begin handling my division and some special business cases through ATTIS, retail, and sales to the end users sales force.

“Digital processing of voice is something we kind of wrote the book on, so I think you would expect us to bring that kind of dimension to the business.”

I think we're finally at the stage where software is going to be a major piece of the business in the profit sense. People have been saying that for 10 years—next year it's always going to be software's year. I think we are finally getting to that point and the reason is that the volume of boxes as you get down into more and more users of small business is high enough that you are getting reasonable margins. So you're really coming into the age of software.

Where do you see the personal computer at the end of 1984, the end of 1985 and the end of 1986?

Scanlon: They're all pretty close together, how about the end of 1986? That's far enough out. I think you have something that has 2 Mbytes of memory on a full 32-bit microprocessor, a real operating system, like UNIX, and tremendous improvement in the human interface. You are going to see everybody multiwindowing, using pixel terminals, mouses, voice in, voice out, all that

kind of stuff.

What would the price point be on that?

Scanlon: I think you are going to see the prices stay more or less constant but ever more important. Today's personal computers, compared to the ones you are going to see in 1986, are going to look pretty primitive, but I think you are going to see the price

stay about the same. I think the reason is that the industry has pretty well figured out what the willingness to pay level is, so you are going to give more for roughly the same price. Of course that's always contingent on the overall competitive situation.

Is there any other leap in technology you see that makes AT&T different from the other players in the computing market?

Scanlon: Digital processing of voice is something we kind of

wrote the book on, so I think you would expect us to bring that kind of a dimension to the business. Also, integrating the box that now does computing with more communications.

Do you envision a day when you can just sit down at your personal computer and call up one window or another by voice?

Scanlon: Yes. That's got to be a combination of technology. You've got to get that in a chip to make it cost effective. The other thing is that process is always going to be a process where the machine has to learn about you, it's got to learn your vocal track, your flexes. But that's going to happen and, that coupled with good silicon, will make it cost effective. Knowing technically how to do it without being able to put it on a chip is not going to make it useful to the masses. You've got to be able to influence the silicon in the box because those kinds of things are really what's going to distinguish vendor “A” from “B” in the market.

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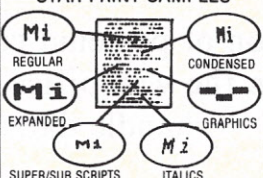
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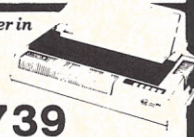


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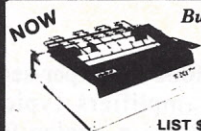
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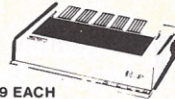
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The 'Computerization' Of The Telephone

The proliferation of personal computers is causing a revolution in the way office telephone systems handle data.

by Kevin McKean

The conflict between voice and data for over-wire communications is as old as the telephone itself. Alexander Graham Bell started it when, in 1876, he constructed the first instrument for transmitting the human voice by wire. Prior to that, wire transmissions were dominated by the telegraph—which was, after all, a *data* instrument, however primitive. It used an encoded system of dots and dashes not unlike the “on” and “off” bits of modern data communications. But by projecting the magic of human speech directly, Bell’s invention drove the telegraph into technological extinction. And as the worldwide network of telephone lines was constructed over the next century, it was *voice* that was the principal medium.

Today, it is *data* that is staging a revolution in the design of new telephone systems. When it comes to a more efficient way to transmit information, voice has no case. Computers can send information faster than even the fastest-talking actor in a Federal Express commercial. And conversations between computers are becoming ever more common on the wires.

To meet this challenge, the telephone industry is bringing out a new generation of phone systems that can handle data with as much aplomb as

voice. The principal characteristic of these new systems is that they are able to mix voice and data on the same line without interference.

By linking personal computers with the other equipment in an office, the new systems are vying with local area networks (LANs) and dedicated lines to become *the* business communications system of the future.

Some companies tying specialized terminal hardware to the new telephone technology, however, tend *not* to emphasize one key fact: Personal computers can be plugged into the new phone systems just as easily as anything else. And the ability to overcome, in one package, the conflicting demands of voice and data transmission, is as much a breakthrough for computers as for telephones. The essence of that conflict stems from the different nature of the information transmitted.

A jumble of frequencies

The human voice consists of a jumble of frequencies mostly in the range from about 300 to about 4000 cycles per second. (Human hearing, and good stereos, go much higher: to 20,000 cycles per second or so. But these higher frequencies are not essential for a voice to be understood.) It is no accident that the amplifiers and switching equipment of most telephone systems are designed to faithfully reproduce frequencies only

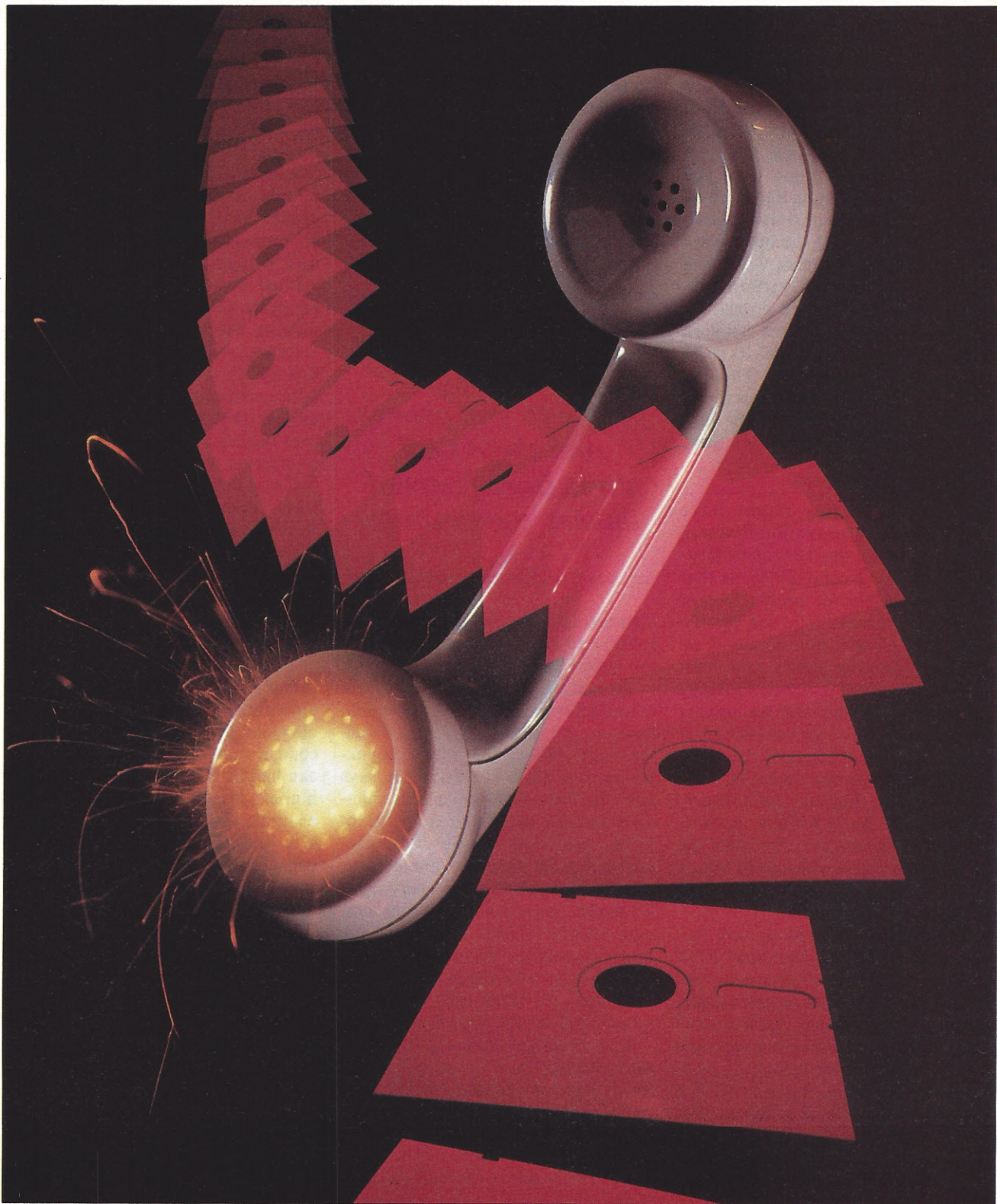
in the zero to 4000 cycle-per-second range. These amplifiers typically handle transmission in *analog* form. That means the electronic signal that travels down the wire is a scale model, with all the peaks and valleys of the original sound waveform represented in proper proportion.

In order to communicate over the phone system, computers have to disguise their digital signals to look like analog signals—in fact, to look something like the human voice. This is what the standard modem does. It takes a digital signal and translates it into a warbling sound composed of frequencies in the range from 1050 to 2250 cycles per second, well within the range of the human voice. At the other end, another modem translates the signal back to a digital form the receiving computer understands.

Modems are fine for sending data at relatively low speeds: The frequency response of a typical phone company amplifier limits transmissions to about 4800 bits per second (though most modems run even more slowly, at 300 to 1200 bits per second). But because the modem transmits at voice frequencies, you cannot talk on the line while it is sending or receiving. And modems are too slow for the kind of application where large volumes of data have to be moved in a hurry. In the typical company with a mainframe computer, for example, the computer and its terminals con-

Kevin McKean is a staff writer for Discover Magazine.

*Personal computers can be plugged into
the new telephone phone systems just
as easily as anything else.*



Telephone Special Effects by David A. Wagner/Animation by Dale Sloat

verse at rates of 9600 bits per second and up.

Only a few years ago, notes Harry Newton, publisher of *Teleconnect* magazine, the conflicting demand in data rates had divided the world of computer communication into two camps. "At one extreme were the hackers who would hang a modem on their personal computers and dial all around the world. At the other were the data processing gurus, with a big mainframe tied to a zillion terminals." The hacker had no use for the high-speed, hard-wired network of the data professional, with its strict communications protocol. The DP (data processing) professionals found personal computers irritatingly individualistic and, by comparison, slow.

A telephone revolution

There the situation might have rested, but for a revolution that was taking place in the telephone business. A series of court decisions that made it possible for people to own their own phones, followed by the landmark AT&T divestiture decision, was fostering intense new competition. The change was particularly apparent in the market for private phone systems, also called PBXs (for Private Branch Exchange). In 1978, AT&T and its former manufacturing arm, Western Electric, built nearly 50 percent of the \$1.8 billion in PBXs that were sold that year. By 1983, the PBX market had swollen to \$3 billion annually. But AT&T's share had fallen below 30 percent.

The biggest market growth occurred among the smallest PBX systems—those of 100 phones or less. Small- to medium-size companies, like individual people, were discovering that they could save money and improve their phone service by owning the equipment themselves. But the competition for this market was intense. The newest edition of Newton's guide to small telephone systems, titled "Which Phone System Should I Buy," lists more than 80

manufacturers. "To the user, the person who has a telephone on his desk, they are all pretty much alike," Newton says. Most include such formerly "sophisticated" features as speed dialing (in which an often-used number can be reached with the press of a button or two), call forwarding (in which a phone can be set to forward calls automatically to another number), least-cost routing (in which the system automatically sends a long-

*Court decisions made
it possible for
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And the AT&T
divestiture fostered
intense competition.*

distance call over the least expensive route) and call accounting (in which the system keeps a record of all calls).

To beat the competition, telephone manufacturers realized they would have to add something extra—and, for many of them, that something extra became data. The rationale, says John Striker, communications manager for the communications giant Time, Inc., was simple: "It's projected that by the end of the decade, there'll be a terminal on every desk. To make these terminals communicate with a central computer, you have two choices. You can either run an umbilicus from the terminal to the computer, or hook into the phone system and let the phones do it."

The advantages of going by phone, says Striker, have to do with flexibility and convenience. "If I want to move a hard-wired terminal, it can take weeks to do the rewiring. If I want to move a phone, I have someone carry it down the hall and plug it in."

It was with this sort of convenience in mind that, four years ago, the Lincoln National Corp. of Fort Wayne, Ind., set out to modify its phone system. Lincoln, the holding company for Lincoln Life Insurance, was installing an advanced automated office system that would put 1000 terminals at the disposal of its 2800 employees. And then-director of communications Michael Goldman and project manager Jim Tunis wanted a phone system that would integrate voice and data. "It was like looking for the Holy Grail," says Goldman, today a vice-president. "It just didn't exist." But Lincoln was able to solve its problem by turning to devices that allowed it to ship data over the existing phone wires without interfering with voice.

These devices, made by companies like Teltone Corp. of Kirkland, Wash., and Micom Systems, Inc. of Chatsworth, Calif., are able to "piggyback" data onto a voice line by boosting the data transmission frequency up to a point out of the range of hearing.

They rely on the fact that, although conventional phone system amplifiers generally handle only frequencies up to 4000 cycles per second, a standard twisted pair of wires can handle frequencies that go much higher. Micom's Instalink 460, for example, consists of a box about the size and price of a typical direct-connect modem that sits underneath the telephone set. It is connected to the telephone and the wall-mounted telephone jack by a standard RJ11 modular phone plug. It can connect to a personal computer through a standard RS-232 plug. When the computer starts sending data, the Instalink 460 encodes it in an analog signal much the same way as a standard modem. But it uses frequencies in the 68,000 to 178,000 cycle-per-second range, some three to eight times higher than the ear can hear.

These frequencies are sent down the line to the central telephone

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switching station at data rates of up to 19,200 bits (or 19.2 k-bits) per second. At the switching station, a second piece of equipment plucks the high-frequency analog signal off the wire and converts it to digital, leaving the voice signal undisturbed. The digital signal can then be dumped into a mainframe computer. ("It turns out that most companies have their mainframes right next to where their PBX winds up," says Micom's Bill Musgrave.) Or, it can be routed into something like Micom's Micro600 Port Selector—a \$6000 to \$10000 microcomputer that functions like a mini-PBX for data, connecting the company's computers with each other or with the outside world. With Micom and Teltone equipment, Goldman says, Lincoln was able to install its terminals at a cost of under \$500 per line, as compared to \$1000 to \$1500 per line for new wiring.

The digital explosion

While Lincoln's system remains a very cost-effective way to integrate voice and data, the newer phone systems go even further with fully digital voice/data integration. The revolutionary move toward formatting all electronic communication digitally is part of the general trend that is sweeping the audio industry. Recording studios and stereo manufacturers are switching to digital technology because it gives them more control over a signal and virtually eliminates signal degradation, commonly referred to as "noise."

But digital telephone transmissions have another virtue: Because they are already in digital form, it is easy to interleave data with the voice. This is the basis for the new all-digital phone systems introduced during the last two years by AT&T, Northern Telecom, Rolm, NEC and about a half-dozen other manufacturers.

At *Personal Computing's* offices in Hasbrouck Heights, N.J., the "beta" test is ongoing for NEC's (Nippon Electric Corp.) NEAX

2400 Information Management System which handles voice and data simultaneously. At its core is an 8086-based microcomputer with 2 Mbytes of RAM which can process data throughout the system at 9600 baud and implements a local area network through multifunction phones. But personal computers can also be linked to the system through standard RS-232 interfaces. The

*A codec located in the
phone desk set
converts the analog
signal generated
by the speaker's voice
to digital form.*

NEAX 2400 takes messages just like an answering machine, but stores them in digital form on a disk rather than in analog form on magnetic tape. A person can record a voice message and instruct the system to send it automatically, at some later time, inside or outside the office.

In a typical digital system, for instance AT&T's System 85, or its new System 75 (announced late last April) for small businesses, a piece of equipment called a codec located in the telephone desk set converts the analog signal generated by the speaker's voice to digital form. For each second of speech, the codec produces 64 k-bits of data. (It samples the waveform 8000 times a second and, for each sample, produces an eight-bit number describing its voltage at that instant.) These 64 k-bits of "voice data" are then interwoven with 64 k-bits of computer data, and 8 k-bits of switching data, and sent down the line. (The switching data is used to do such things as regulate the

flow of information and indicate which buttons have been pushed on the desk set.) All of this fits quite comfortably on two pairs of twisted wires, one for incoming and one for outgoing traffic.

The fact that each channel is limited to 64k-bits a second is more a matter of convention than technological necessity, says Al Hicks of AT&T's information systems division. "As far as the capacity of the twisted pair, there is nothing to prevent you from going higher," Hicks says. "It's just economics and what you are willing to pay for." Adds Brian Murphy of Northern Telecom: "In the next year or so, we'll be able to communicate data at speeds of one megabit (one million bits per second) or more over a twisted pair."

Northern Telecom's SL-1 system now permits speeds of up to 19.2 k-bits per second for asynchronous (personal computer standard) data and 56 k-bits per second for synchronous (most mainframes) data. AT&T's System 75 is limited to 19.2 k-bits for synchronous and asynchronous data. But AT&T's own 515 terminal can send at the full 64 k-bits a second.

Like most digital systems, the SL-1 and System 75 offer the capacity to multiplex data lines together. Typically, they cram roughly two dozen of the 64 k-bit data channels into one 1.544 M-bit capacity line—the standard line for long distance digital transmission since the 1960s—so that 200 or more existing lines could be accommodated within a handful of multiplexed digital lines, at great cost savings.

With voice and data thoroughly intermingled, the all-digital systems have turned their attention to accommodating as many computers as possible. Northern Telecom sells an IBM Personal Computer interface for about \$300 that allows a Personal Computer or XT to be plugged directly into a telephone jack. At the other end, the company supplies a

protocol conversion device that allows the Personal Computer, or any other terminal on the system, to look like an IBM 3270—the terminal that is used to connect to IBM's mainframe computers. "That means you can take any low-cost personal computer or ASCII terminal and make it look like a 3270 to the mainframe at the other end," says Murphy.

Some digital systems also offer some sort of liquid crystal text display on the telephone itself. The Personal Teleterminal by CXC Corp. of Irvine, Calif., has a relatively large (for this industry) three-line by 80-character display that scrolls indefinitely for viewing long messages. A person can return a phone call simply by hitting the "auto return" button while a message is displayed. The display also shows who is calling when the phone rings, provided the caller is within the CXC Rose system, which has the capacity to carry data at 128 k-bits per second.

Although the uses of other advanced pieces of phone equipment may be more immediately apparent, their prices are uniformly high. A typical all-digital phone system, like AT&T's System 75, costs \$600 to \$900 per station.

Nevertheless, these advanced telephone systems offer the potential to tie all communications of an organization into the same flexible network with one wiring scheme. When the costs of rewiring a building for a new computer system or local area network are considered, the phone alternative is more attractive.

It can be attractive as well for users of personal computers. With the RS-232 jack on the back of new-generation telephones, the personal computer user can tie his machine to any other machine reachable through the system. You can also trade data at rates which far exceed the modem-limited speeds commonly associated with small computers.

Teleconnect's Newton points out: "Most personal computers will han-

dle transmission rates of at least 19.2 k-bits per second. That's part of the RS-232 standard. But you can do it only over a copper wire that's no more than 50 feet in length or else you have to amplify the signal in some way." With a system capable of integrating voice and data, however, that 50-foot limitation only applies to the length of wire between the computer and the phone jack. Once it reaches the phone

There is no need for a modem with an integrated voice-data system. But a computer user can use a modem if he wants.

intact, the signal can travel anywhere within the same PBX at 19.2 k-bits per second, or to distant PBXs linked by a multiplexed, 1.544 M-bit line.

With an integrated voice-data system, there is no need for a modem, since these systems are usually designed to switch in a modem only when necessary. If a personal computer user wants to transmit via modem he can. The phone system will treat it as an analog (voice) signal rather than as data.

To a certain extent, the new systems even do away with protocol conversion problems. Those systems that offer IBM 3270, X.25 or Ethernet emulation make it possible for personal computers to communicate via networks or systems that use those protocols. There is no need, then, for the expensive individual software that would be required without the new phones. Although the current crop of protocol conversion devices are mostly designed to emulate big computers, the same sort of thing could be done

for any two machines. The point is, these are intelligent devices that go far beyond just the logical switching operations of an ordinary phone system.

When such intelligent interfaces are lacking, however, the personal computer user will still have to be sure that what his system sends will be intelligible to the receiving computer, just as he would for ordinary communication via modem. And like any enhancement, protocol conversion devices add to the total cost of a phone system.

But cost is not the only factor standing in the way of the new systems. Says Newton: "In large corporations, the data processing has always been handled by one department, and the telecommunications by another, and they have their internal battles. The DP people are not very enthusiastic about personal computers anyway. And when they set up an expensive mainframe, they don't want to have to shove its data through a PBX over which they have little or no control."

Companies that want the top of the line in integrated voice and data will probably want a sophisticated, all-digital system like those of AT&T, Rolm, Northern Telecom, etc. For smaller companies with a tighter budget, Newton recommends products like those of Teltone and Micom. These products do most of the things that all-digital systems do: switch and multiplex data, emulate protocols, connect to packet networks. But they do it less elegantly and for a correspondingly lower price.

For the private individual who has a limited budget, Newton recommends what he calls the "low-cost" solution to the voice-data problem: two phones. "The thing about having two phones on your desk is that you don't always have to use the data phone for data," Newton says. "Then when the airlines put you on hold for four hours, you still have a phone left to take calls." 

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How Managers Can Get The 'Best' Personal Computer

When it comes time to buy the corporate personal computer, there is no substitute for bottom-line homework.

by Craig Zarley, Contributing Editor

In the first two installments of this three-part series, Personal Computing explored centralized personal computer purchasing in large corporations, as well as the involvement of individual managers. This final installment examines the questions—and answers—managers need to deal with to wind up with a system that meets their needs.

Do I need a personal computer? How can I ensure getting the one that is right for me? Thousands of corporate managers have answered the first question with a resounding "yes." But the answer to the second is less clear. When it comes time to buy the corporate personal computer, the novice is likely to get an ear full of the prevailing wisdom: Define your business problem, find software that promises a computerized solution, then buy a machine that runs the package. As advice goes, this is as good as any. But the neophyte who follows it slavishly, without further exploration, may not wind up with a computer system that fits the bill.

"The traditional method of choosing a personal computer is too myopic when you don't understand what computers can and can't do," says Robert J. "Bear" Barker, financial systems manager at Monolithic Memories, Inc. He explains that too often people want to simply transfer what they have been doing with paper and pencil directly to the com-

puter. The results can yield complete frustration.

"On some spreadsheets you may want to sort data by dates," Barker says. "So you enter your dates logically with slashes between the numbers the way you've always been doing it. Well, on some programs you can't sort dates that way and you'll end up re-entering the numbers. You can learn this on your own but if you leap in without someone there to help you, it may take you months to get up to full speed."

This is just one of the little traps business people fall into when buying the corporate computer. There are others. The application-software-hardware linear approach just doesn't cut it any more. At the corporate level, training and maintenance carry as much weight as the price/performance of the hardware. Companies and individuals within them simply can't afford lost productivity from either technical problems or a flat learning curve.

It used to be that personal computers trickled into corporations. A few individuals discovered computing on their own and decided to bring the personal computer to the office. Not so anymore. Some corporations now introduce personal computers to virtually all of their employees seemingly overnight. At Monolithic Memories, for example, the president of the company mandated that all 4200

employees take a four-day introduction-to-computers class. When computing comes that fast, the danger of making shortsighted buying mistakes increases.

All personal computers are not created equal. Just as there is no one computer that will solve everyone's problems, there is no standard checklist that will ensure the perfect corporate buy. There are, however, some basic questions business people in large corporations should ask before they buy. The answers can help expose some potential pitfalls and clarify the view before a headlong leap into computing.

Who is going to use it?

The first question to ask is: "Who is going to use the computer?" This may seem an obvious first step, yet it is often overlooked in corporate purchasing policies. But not by Rick Richardson, national director of micro-technology at Arthur Young, the accounting firm. Richardson advocates selecting the personal computer on a case-by-case basis. He evaluates hardware and software, then advises users as to which system best fits their needs. When he looks at who is going to use the system, the first thing he considers is the number of hours of daily usage. "We tend to divide users into two categories: the casual user and the power user," he explains. "The power user wants

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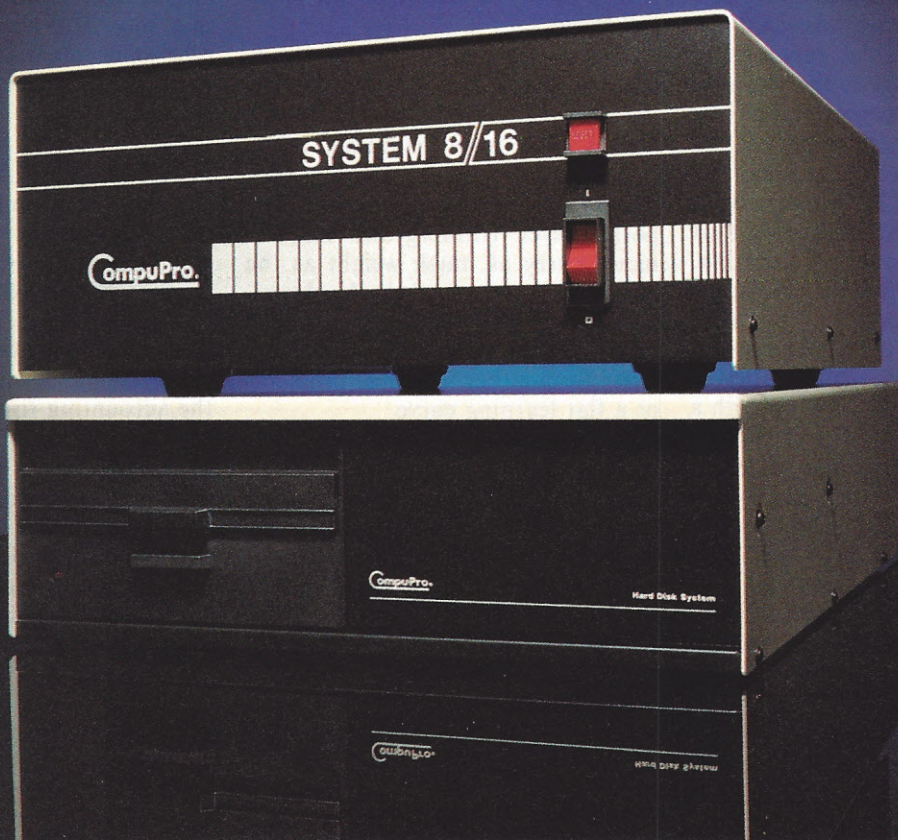
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The Essential Computer™

CIRCLE 121



functionality. The casual user wants ease of use."

A power user may be someone like an accounting manager who develops a complex spreadsheet and spends much of his day at the computer. The casual user, on the other hand, is someone who may work at the computer less than an hour a day. This person wants the computer at his desk to do what he needs done—and then he wants it off.

Arthur Young offers its managers training and support on personal computers made by Apple, Texas Instruments and IBM. "A manager has to decide where he fits in the scheme of things," says Richardson. "For a power user, I would recommend the Texas Instruments Professional Computer or the IBM Personal Computer, anything in the MS-DOS world. For the casual user, I would probably recommend Apple's Macintosh or maybe the Lisa."

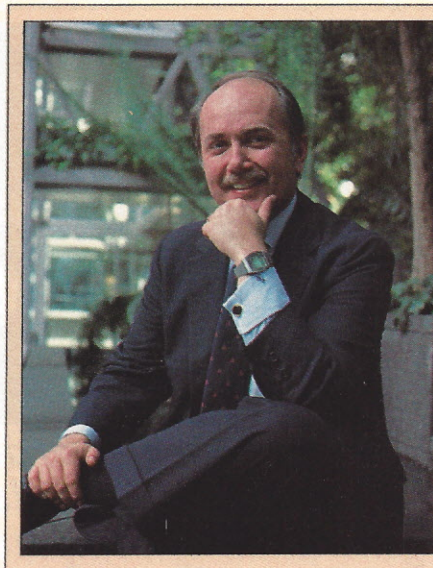
He contends that the power user probably wants to use Lotus 1-2-3 and perhaps needs to edit WordStar reports produced by his secretary. Because he's going to be at the computer a significant portion of his work day, he doesn't mind investing time in training and will not be bothered by the various command structures for different software packages. But the casual user is another story. He wants his computer to be as easy to use as the telephone.

"The MS-DOS computers are big and powerful and that may be what you need," says Richardson. "But the personal computer world has been governed too long by the standards of the power user. Other computers do things reasonably well but are far easier to operate. You need to ask yourself how familiar you are with computer technology and what you want the computer to do for you. Starting from the point of view of the person who's using the machine makes more sense than just saying, 'We already have a network set up so we're going to buy 2500 of this

system.' That's the wrong way to go because it presupposes that is the type of computer everyone needs."

While Richardson spends much of his time evaluating hardware and software, he classifies himself as a casual user. He chose the Lisa as his own personal office computer be-

puter to buy, business people need to weigh power against ease of use when you consider the purchase price of the system. The power versus ease of use is not entirely a black and white issue. The two qualities are on a collision course, especially as independent software vendors start designing



"We tend to divide users into two categories: the casual user and the power user. The power user wants functionality. The casual user wants ease of use."

Rick Richardson
Arthur Young

cause of its flexibility and ease of use. He rarely uses the computer for more than an hour and a half each day. He needs word processing software, a spreadsheet, list management capabilities and graphics. Lisa came bundled with all those applications and each program uses the same set of commands so he didn't have to spend a lot of time learning how to use several different packages.

"Power users don't mind different command structures for different software packages," he says. "But I do. I'll write a one-page letter or a memo, figure the department budget, keep my calendar and contact list on the computer, and that's all I'll use it for—the informal things that I do each day that make me do my job better. I want the ease of use instead of a computer that's going to run a spreadsheet with 2000 rows."

When deciding which com-

programs which take advantage of Lisa technology. The question people need to ask themselves is how much are they willing to invest for a powerful system that is easy to use. Instead of considering simply the hardware's price tag, it's best to think more in terms of potential returns on investment.

As Richardson notes, "Let's say you spend \$7000 for a system that you use, and you spend \$4000 for someone else's box and it gathers dust. Which is the smartest investment?"

When price considerations are paramount, another form of myopia slips into the decision-making process—basing the number of computers in a corporation on saturation use. In other words, if someone buys one computer, he shouldn't wait until that one is being used every second of the day before he buys another one. To do

so turns the computer into a shared workstation instead of a personal business tool.

"When you talk about putting a computer on someone's desk, it needs to sit there on demand like a telephone," Richardson says. "The number of phones isn't based on how many hours a day you use them and the computer shouldn't be either. If I have to work on confidential stuff in my office or pull up a client contact list while I'm on the phone, I need to have a computer on my desk at all times that is available on demand."

The department standard

While choosing one computer for everyone in a large corporation is a dubious venture, there is a case for a departmental standard, especially if the people share a lot of data. People working in the same department do in fact perform many common tasks. As Barker of Monolithic Memories explains, "We prepare investment summaries, cash forecasts, annual plans and other financial reports that must be compiled in a hurry. Not only do we swap a tremendous amount of data but the computers themselves are shared."

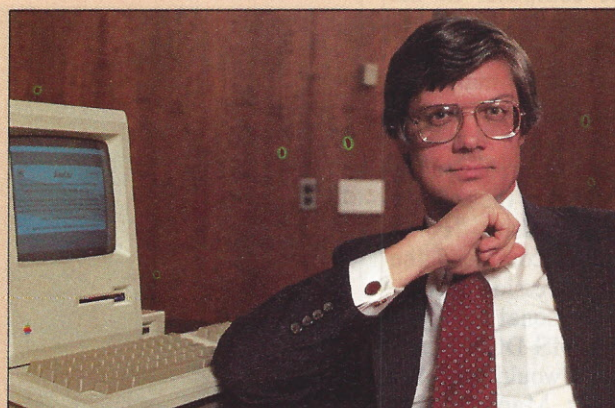
Monolithic Memories, like many other corporations, opted for a standard corporate computer, the IBM Personal Computer. "From the beginning, we decided to go with one vendor," explains Glen Gertmenian, systems planning manager for the company. "We looked at Apple, IBM and DEC. We considered which companies were going to be around to provide continuing support, what was the availability of software for their machines, and did the system fit in with the long-term corporate data processing strategy."

Standardization is fast becoming the vogue in many corporations. When you have a single corporate computer, training and maintenance is easier. As Gertmenian notes, "With standard hardware, networking is easier and we don't have to hire

extra trainers or technicians who are experts in various systems."

Barker's department has 12 computers—three IBM XTs, seven IBM Personal Computers and two IBM-compatible Compaq portables. The standard software is Lotus 1-2-3. The departmental standard was imposed

When there is a departmental standard, many training headaches can be eliminated. There is always that first step to overcome. Corporate data processing departments, computer manufacturers and retailers, and outside consultants can all provide that initial instruction novice



"We wanted a vendor with a solid reputation who would be in the next generation of computer technology."

Dick Webb

Peat Marwick and Mitchell

on Barker because the hardware and software decisions came from the corporate hierarchy.

"In 1982, when the company made the decision to go with IBM, I really didn't have a strong opinion one way or the other as to which personal computer I wanted," says Barker. "I just wanted an electronic spreadsheet and system compatibility because of the amount of data we share between staff members. But most of all I wanted someone to show me how to use the computer."

In spite of careful planning, not all of Monolithic Memories' training problems were solved before the computers were introduced. "When the first one arrived, it sat there for several months because nobody had any experience," Barker recalls. "Finally we just forced people to start using it."

users require. But experienced users within a department can be the best source of ongoing training when hardware and software is standard.

Once a few people are familiar with the system, they can in effect act as trainers for others. Often, a simple problem can be solved by asking a co-worker for help. When this word-of-mouth training projects itself throughout an entire corporation, an interesting network can develop, although probably not the one envisaged by corporate planners who adopted a single hardware standard.

Instead of an electronic network, a people network springs up. After a person uses his computer for a while, he'll inevitably want to do something else with it. Barker spends most of his time working with spreadsheets, but recently he wanted a project schedul-

ing program for his department.

"I went to MIS (management information services) and told them what I wanted and they directed me to another department in the company that was using Harvard Project Manager," he explains. "All I had to do was go to that department and ask the people the good and bad aspects of the package and get a demo."

Setting the standard

While there may be a case for standardization of hardware and software within a department, the corporation-wide standard runs into trouble, especially in very large companies. Even in companies like Monolithic Memories, "IBM only" is evolving to "IBM sometimes." The company is looking closely at buying Apple's Macintosh computers so that security personnel can track company equipment that is borrowed by employees.

When companies set out to establish a corporation standard, they'll soon discover that they need a police force to maintain it. When individuals realize another system can better solve their problems, the standard will inevitably erode as other computers creep into the workplace. In some cases it is better to plan for a variety of systems, because the "shoot for the middle" approach can be crippling if the prescribed standard doesn't solve the specific business problems it was aimed at.

Peat Marwick and Mitchell, the international accounting firm, went through a detailed search when it chose the corporation's personal computer. And after an extensive evaluation, the company adopted a standard—several of them in fact. The corporate tax department chose the IBM Personal Computer, the consulting department gave managers the option to purchase the system of their choice and the auditing department recently bought 3500 Macintosh computers.

The auditing department designed

proprietary software called Systems Evaluation Approach-Computerized Audit Supports (SEA-CAS) to run on the Macintosh. Peat Marwick auditors will use the system to conduct field audits. The system has the ability to perform detailed financial analysis necessary in the auditing process, along with the capability to communicate with virtually any mainframe computer.

The auditing department's decision-making process is a good roadmap to follow, because it studied in detail most of the options anyone should consider before they buy the corporate computer. Dick Webb, Peat Marwick partner in charge of SEA-CAS, says the auditing department began its search for the best computer to fill its needs in 1980. The search committee examined the available literature on virtually all personal computer manufacturers, sent out requests for information and finally made visits to five companies before deciding on Apple.

"We wanted a vendor with a solid reputation and one that would be in the forefront of the next generation of computer technology," explains Webb. "Beyond that, we needed a computer that was portable, easy to use, and the price had to be right."

The choice of the Macintosh and the proprietary software came after a detailed examination of what tools were needed to complete a field audit. "We decided to write our own software because the packaged programs that we saw on the market lacked the communications capabilities we needed," says Webb. "And we wanted a spreadsheet program specifically tailored to our practice."

The SEA-CAS system lets the auditor pull information from the client's mainframe. The software also has the ability to communicate with the proprietary tax analysis software running on the tax department's IBM Personal Computers.

"The tax department went through a similar search procedure and

decided the IBM Personal Computer was the best choice for them," he explains. "The consulting department decided they didn't need a standard because of the individual nature of the consultant's work. As a result, consulting managers have Gavilans, Apples, or IBM Personal Computers, whichever system they feel is best for them."

While the choice of hardware and software was very application specific, Webb feels training played a big part in the decision to go with the Macintosh. The auditing department must train 7000 auditors. Webb predicts it will take eight-to-30 hours to get each one up to speed on SEA-CAS. But almost no time will be spent teaching managers how to operate the Macintosh itself.

"The Macintosh is so easy to use that just about anyone can learn how to operate it on their own," he explains. "What we teach instead are the preferred spreadsheet techniques that we want all our auditors to adopt."

Fending for yourself

Before business people buy the corporate computer, they need to start from a detailed analysis of what their job entails and what they want the computer to do. After they've made the hardware and software choices based on specific needs, they have to satisfy their requirements for ongoing training and service. When corporations actively encourage the introduction of personal computers, the MIS department or another support group can help individuals sort through the myriad of options. But what to do when tunnel vision at the top keeps a person from getting the computer he or she needs? Leslie Mastalarz, editor of sales publications for McKesson Drug Company in San Francisco, had to fend for herself securing approval for her department's recently purchased Lisa computers. "I was at a seminar several months ago and the subject

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was Lisa," she explains. "At the seminar I kept telling everyone how IBM blue we were. We're one of the largest users of the IBM 34, 36 and 38. There are a few IBM Personal Computers floating around the company, but for my department's application, IBM didn't give us what we needed."

What Mastalarz needed was typesetting and design capabilities. Her department publishes several publications in both printed copy and microfiche. She wanted a system that could produce camera-ready copy, including variable type fonts and artwork. The LisaDraw and the other five bundled Lisa applications gave her those capabilities. The Lisas in her department will soon be linked to a Compugraphic typesetter which will be able to translate anything produced on the Lisa screen into camera-ready format. She figures the system will save her \$80,000 each year in typesetting costs.

After she realized what the Lisa could do for her department, her immediate task was to convince her superiors that the Lisa was what she needed. "What we have now is a capital expenditure program," she explains. "Each manager puts his equipment request on a piece of paper and when someone sees that it is a computer, the request gets routed to information services before any money is allocated."

Doing your homework

When individuals go against the grain, the burden of proof is on them to justify their system purchase. If a person can prove an ongoing application for a specific computer other than the standard, he or she will usually get the system. But hard facts are required, especially ones that show the new system will save money.

Mastalarz played the numbers game to win her Lisas at McKesson. "I told the committee what type of system I wanted, how much it would cost, and how much money I could save," she says. "And if you don't

have a support group, you have to do the entire evaluation yourself."

She advises managers in a similar situation to examine all systems that are readily available in their area. This probably means going to a local computer retailer or hiring a consultant. Once you settle on hardware

whatever system you need, no matter what the corporate standard.

Ray Craft, Weyerhaeuser Company's manager of systems and programming services, sits on a committee that hears managers' requests for personal computers. Weyerhaeuser went through a systems evaluation



"I was willing to spend more for the Lisa because all of the software I needed was bundled with the system. And my training costs are negligible because Lisa is so easy to use."

Leslie P. Mastalarz
McKesson Drug Company

and software, ask the retailer for the names of some users. Talk to them and find out exactly what they are doing with the system and if it meets their needs. Remember, too, that it's extremely important to look beyond the initial purchase price of the hardware and software when making the final choice.

"I was willing to spend more for the Lisa because all of the software I needed came bundled with the system," says Mastalarz. "And my training costs are negligible because Lisa is so easy to use, which is an important consideration when you don't have internal support. The Lisa instruction manuals are fantastic."

Mastalarz got the computer that was best for her because she performed her own evaluation. Even in companies where you apparently have no choice, if you've done your homework you may be able to buy

process and lists IBM and DEC personal computers on its approved list. Managers who make a thorough presentation demonstrating the need for a computer are virtually assured of getting either an IBM or DEC computer. But if they want to go outside the approved list, they have the added burden of showing the committee the need to violate the standard. Craft says numbers are the key to winning your case.

"Evaluating personal computers and productivity is a very subjective task," says Craft. "We had one guy come in with a bunch of statistics showing he could do his job five times faster with the resulting savings in money. Now how can you argue with that?"

No one can. Because when push comes to shove, the answer to the question "Who buys the corporate, personal computer?" is: "You do." 

Personal Computers At The Olympics

The personal computer is at the Olympic starting gate, waiting for the opening gun in the race for the gold

by Karen Freifeld

Come August 12, when the flaming torch at the Los Angeles Memorial Coliseum is extinguished and the largest Olympic Games in history are over, the personal computer may deserve a gold medal all its own.

The 1984 Summer Games mark the first time personal computers will figure significantly in the Olympian task of monitoring, scoring and managing the quadrennial extravaganza. Almost every aspect of the XXIII Olympiad, from its logistics to its financial bottom line, now depends to some degree on personal computer support.

The Los Angeles Olympic Organizing Committee (LAOOC), for instance, has been using an IBM Personal Computer to manage an investment portfolio that ranges into the hundreds of millions of dollars. It's also keeping computerized inventories of such supplies as 300,000 articles of clothing and 200,000 pieces of technology equipment. It has projected staffing and budgeting requirements with such off-the-shelf software packages as Multiplan and Lotus 1-2-3, while its three full-time programmers have developed between 15 and 20 programs for specialized needs (such as staffing a

security system for the committee, which has grown from a few hundred employees to thousands over the past year).

During the 16-day sports spectacle itself, some 40 personal computers will be on hand at far-flung competition sites (venues) to compile scores and key statistics. At the Olympic villages, personal computers will track bus schedules to make the most efficient use of the fleet of buses for athletes, coaches and officials who are expected to log some 2.3 million miles during the course of the Games. At each of the 23 venues, as well as the three Olympic villages, personal computers will store personnel records in addition to financial reports, so last minute purchases can be approved in seconds. Should anyone in the 50,000-member Olympic family need to receive a message, he or she will be able to check for it on one of the IBM Personal Computer color monitors (attached to an IBM-80 distribution system), which will continually roll four columns of alphabetical listings.

So although they may go unnoticed by the 2.5 billion spectators worldwide expected to watch the Olympics (over half the world's population) personal computers will be calling a lot of the shots from behind the scenes of this ultimate spectacle. Its astronomic proportions are such that Harry L. Usher, general manager of

the LAOOC, has likened it to staging 80 Super Bowls.

Mainframes and minicomputers also will be heavily at work during the extravaganza. (With an unprecedented \$50 million worth of technology equipment, about the only thing that doesn't seem to contain a computer chip are the athletes, although many competitors have been using computers as training aids.) The larger computer systems will still be responsible for such major tasks as the official results reporting, the main financial system, and the actual accreditation, accommodations and ticketing. To its credit, however, the personal computer has not only taken over many of the jobs of its larger competitors, it's also added feats of its own.

"We're really squeezing the most you can out of a personal computer," says David Wogahn, LAOOC office systems administrator and the man responsible for IBM's donation of 190 Displaywriters and over 200 IBM Personal Computers. "And I think we're finding that it squeezes pretty good."

Great teammates

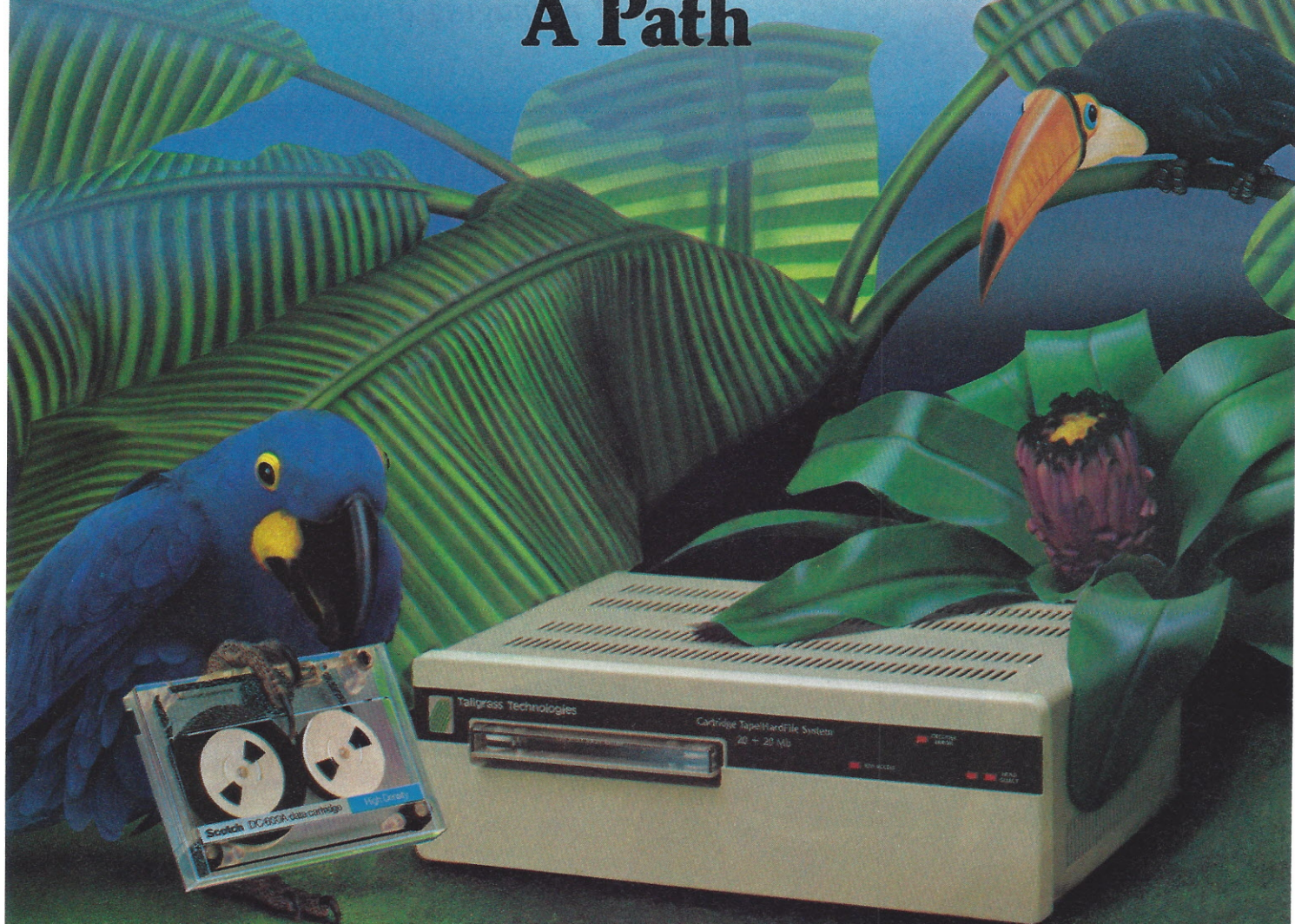
Indeed, not even those running the Games realized what great teammates the personal computers would turn out to be. When the first load of IBM Personal Computers arrived at the LAOOC offices two years ago,

Karen Freifeld is a New York-based free-lancer who frequently writes about computers.

*The 1984 Olympics are the first time
personal computers will figure in the
task of managing a sports spectacle.*



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the committee couldn't even find applications for them. "Our biggest problem when we first got them—and our first allotment from IBM was 100—was that we could only figure out what to do with 27 of them," says Jim Murray, LAOOC technology director. "Now we're in a situation where the demand has grown so large, we can't possibly meet it."

Most of the first shipment of IBM Personal Computers was relegated to

are one of the only ways to get the job done.

"You go through and you say, 'On this date, I'm going to do this and this.' Then you send it down to the construction department or the venue management department and so forth, and they say, 'Oh, no, you can't do it then.' So I've probably gone through six or seven different iterations of, say, a project to deliver and install equipment."

from the \$225 million it paid for the right to broadcast the Games. The LAOOC knew well in advance of the June 2 entry deadline just how serious a financial blow the Soviet backout would be.

"The amount of money is substantial, which leaves us in a very precarious situation," Rodsett told *Personal Computing* in late April, "because, by then, we'll have committed a lot of money. So we have some projections on how—if the Russians do back out—we can cut back quickly."

One of the what-ifs the LAOOC does not want to confront, of course, is what if it suffers the same financial debacle Montreal is still enduring eight years after the Games were held there. Montreal taxpayers are still paying off the \$1 billion deficit. And although the personal computer surely can't take all the credit for keeping the LAOOC in the black, Wogahn says it has helped.

"Without the computer's power that we've had to monitor our progress and status, we might have had problems similar to Montreal's," he says. "Somebody doesn't add the numbers right and the next thing you know the technology budget is \$100 million over and where are you going to make that up? With the personal computer, you're constantly changing those numbers and keeping them in line; it's a lot more exact." (Prior to the Soviet announcement, the LAOOC was expecting a *surplus* of between \$15 and \$20 million.)

Staffing requirements in the LAOOC office were also judged with the help of the personal computer—and updated every two months to keep staff at inventory levels. Rodsett and his finance cohorts, for instance, used spreadsheet projections to determine how many people would be needed in the accounts payable purchasing staff, based on the estimated number of invoices, the time it would take to input requisitions, etc. "For instance, now we've got a staff of 10," Rodsett said at the end of April.

PLACE	NO.	NAME	TEAM	SCORE
1	51	JAMES HARTUNG	USA	9.90
		SUP-J: 9.80 J1: 9.90 J2: 9.90 J3: 9.80 J4: 9.90 N-DEDUC: 0.00		
2	52	PETER VIDMAR	USA	9.80
		SUP-J: 9.80 J1: 9.80 J2: 9.80 J3: 9.80 J4: 9.80 N-DEDUC: 0.00		
3	42	MITSUAKI WATANABE	JPN	9.75
		SUP-J: 9.80 J1: 9.80 J2: 9.80 J3: 9.70 J4: 9.70 N-DEDUC: 0.00		

Computerized American Cup Gymnastics scoresheet, developed by Gary Frantz of ComputerLand in Allentown, Pa., shows points awarded by individual judges.

such obvious areas as planning and budgeting. Off-the-shelf software packages such as Multiplan (which IBM also provided) began to track purchase order requisitions, handle the day-to-day operating budgets, and transmit data to the general ledger program via time-sharing. The LAOOC immediately began training programs for its staff, the majority of whom had never used a computer. "People began to see potential applications in their areas and it just mushroomed," recalls LAOOC data processing director Jackie Henderson.

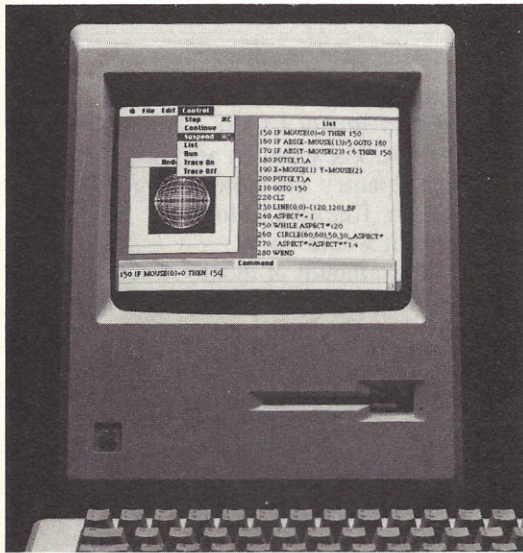
Working on Olympic time, as Henderson explains, has meant a constant race against that July 28 deadline, and that means everything has to be done faster than usual. "A plan that would normally take six weeks, we're asked to do in a week," says Henderson. "So it became pretty apparent, in order to get these things done, and be able to change them once you've done it—because the environment is so volatile—that personal computers

But the benefits of computerizing such operations go far beyond time-saving, adds Wogahn. "I'd say we cut tasks in half in terms of the amount of time they would take if you did them manually," he says, "but I think the important thing is that our data is a lot more accurate, it's more readily available, and we can make better decisions because, at the push of a button, we can totally change a budget, a projection, an inventory report and show the what-ifs and then make an intelligent decision based on that."

Tracking a Soviet snub

Controller John Rodsett says it's the projection capabilities he favors. "What-if games are where the personal computer is at its best," he says. When the Soviet boycott announcement came on May 8, for instance (pending a firm June 2 confirmation at press time), the impact of the move had already been predigested by the LAOOC's computers. ABC-TV's contract stipulated that a certain amount of money be withheld

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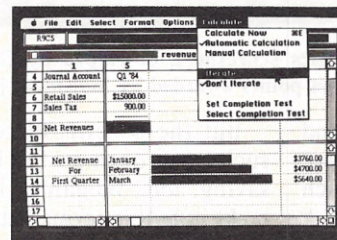
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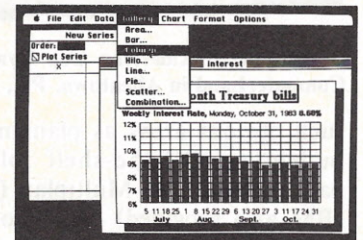
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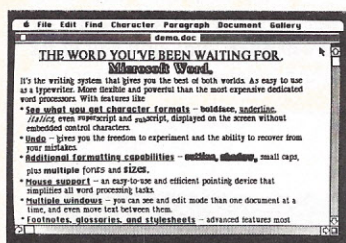
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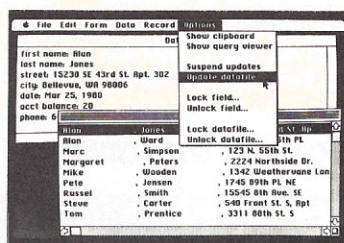
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WATCHING THE GAMES WITH YOUR PERSONAL COMPUTER

Although some 10,000 sports journalists will be scrambling for stories at the Los Angeles Summer Olympics, precious few—primarily the hard news pool and wire service reporters—will be able to plug into the full electronic capabilities of the Games' information systems. The majority, in fact, will be sitting up late in motel rooms with the shades drawn, thumbing through reams of dog-eared, printed background information they will then have to merge with day-to-day results. Consequently, a personal computer user with a subscription to one of the major information utilities, such as The Source, CompuServe or Dow Jones News/Retrieval Service, can actually stay *ahead* of many of the workaday scribes at the L.A. Summer Games.

The absence of the United States from Summer Olympic competition since 1976 makes for timely comparative data—from recent worldwide national team trials—even more in de-

mand as the experts try to handicap the favorites.

"I wouldn't dare try to handicap these Games," says Jeff Dimond, spokesman for the U.S. Swimming Federation, "and I know the track and field people feel the same way. In almost every event, it could be a matter of hundredths of a second—on form alone the competitors are just too close."

Thus, while sportswriters are jockeying for key stats, like best performance year-to-date, heat times from a previous day, you can calmly pull them off the UPI (United Press International) wire via The Source or Dow Jones within minutes of official release. Typically, heats will be run (or swum) on the morning before the following day's evening final. The closer the competition in a given event, the more significant the performances in various heats. With this information downloaded onto a disk the day before the final, combined with special back-

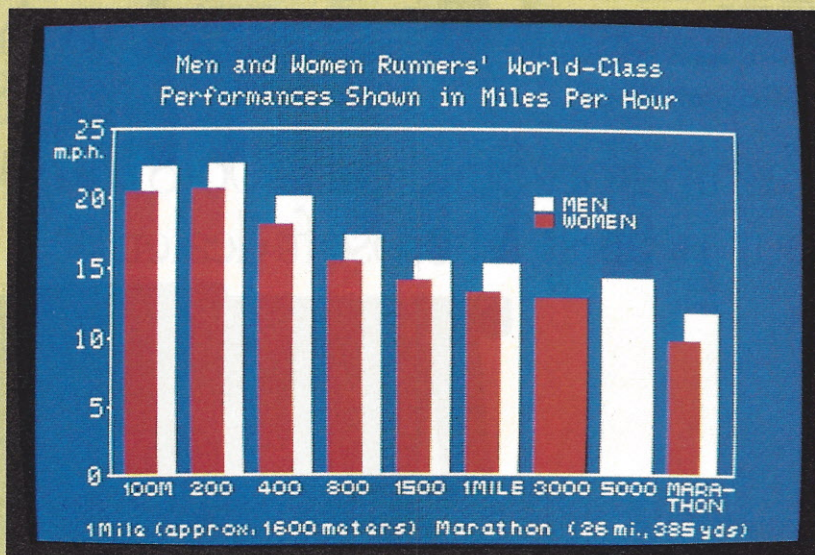
ground material the information utilities will generate themselves, you can be as well equipped in an easy chair anywhere in the U.S. as any "handicapper" will be in Los Angeles.

From that point, all you'll need to become your own sports editor is a bowl of popcorn and the ABC-TV broadcast schedule (check for late-breaking changes). The network plans a record 188 hours of coverage, beginning with a two-hour preview on July 27 and culminating in a highlight review on August 13. Typical weekday programming will consist of four segments: 10:30 a.m. to 1 or 2 p.m.; 3 or 4 p.m. to 5:30 p.m.; 7 p.m. to midnight; and 12:30 a.m. to 2 a.m. (all times EDT).

While public data base services already offer sports news and features, the Olympics is a golden opportunity to demonstrate how well they can keep their subscribers abreast of events almost as they happen. Not only will users be able to turn a personal computer into

A NEW PICTURE OF TOP PERFORMERS

This chart was generated on an IBM Personal Computer using a Plantronics color board and a software package called Videogram (by Softel, Inc., 34½ St. Mark's Pl., New York, NY 10003). A simple formula (Speed equals Distance over Time) with metric-to-mile conversion yields a picture of Olympic performance that is almost never seen by athletes—who rarely care about computations beyond specific times for specific distances. For one thing, it shows that the "world's fastest human" title, traditionally bestowed by the sporting press on the 100-meter dash winner, is a misnomer. The 200-meter dash is actually a faster race, in terms of average speed (due to the larger proportion of total time consumed by the start in the 100). It also shows how world-class women runners maintain a fairly uniform pace of about two miles per hour under the men's standard at all distances, from the sprints to the marathon. What this disparity means can be seen by comparing



average speeds for top men at 5000 meters to that for women in the 3000 meters, their Olympic event. Since women have been competing at the longer distances for only a limited time

on the world-class level, the suggestion is that they may narrow the gap in the future. This is just one example of how a personal computer can take you "inside the Olympics."

Personal computers will be calling a lot of the shots. The astronomic proportions have been likened to staging 80 Super Bowls.

a news wire to get up-to-the-minute results, but a few quick commands, either at home or the office, will tie the computer into a veritable Olympic sports encyclopedia.

Subscribers to the Dow Jones News/Retrieval Service, for example, should find a wealth of information available merely by going through their regular sign-on procedure and then opting for the sports news. This will take them to the "front page" of the sports section, which along with the four top sports stories of the moment will contain a special box offering a menu of Olympic special reports including updated results, feature stories with biographical details on key athletes and cumulative medal standings.

"As each event ends, we should have a quick summary of results within five minutes or so, with a fuller story 20 to 30 minutes later," says William Kelble, data base writer in charge of sports for Dow Jones. Results will generally show the top 10 finishers plus the results for all American athletes in the event. The user will also be referred at the end of stories to related features and background pieces.

Kelble expects he will make use of almost all Olympics-related news that he gets from the UPI wire, plus the encyclopedia to offer instant access to past records, sports rules and other background data. "If we're talking about Carl Lewis' chances for duplicating Jesse Owens' 1932 feat of winning four gold medals, then we will have a reference line there telling the reader to call up Jesse Owens in the encyclopedia if he wants to know more about that," says Kelble.

Personal computer users will be able to begin analyzing the Summer Games well before the opening ceremonies. Source associate editor for news Skip Major described an Olympics preview package to include news coverage of qualifying events in the U.S. and abroad, results of the 1980 Olympics for comparison, Olympic and world records in the various events and short biographies of consensus gold medal contenders.

Users of The Source will access the Olympics data through the main sports menu in which a special Summer

Games category will prompt the subscriber into a full menu of Olympics-related reports and stories. A command to go directly to the Olympics package will be available after signing on. Source users will then have a choice of schedules of events, cumulative medal standing and news updates or features in individual sports. Major also expects to offer a series of trivia quizzes for fans

of particular sports.

While The Source will rely on AP (Associated Press) and UPI wire service reports for most of its coverage, Major adds that he plans to have some special reports from Los Angeles exclusively for The Source. "This will help us supplement the reporting of UPI and AP in those areas where they don't tend to concentrate," he explains.

The Harder They'll Fall: An Olympic Mini Data Base

Will the heat and smog wilt competitors at Los Angeles' Summer Games? Possibly, but some Olympic records will definitely fall. They are the handful of the most vulnerable marks in major swimming, track and field events—those that have survived at least two Olympiads. Most date from Munich in 1972, but several remain from the 1968 Mexico City Games and three of these, incredibly, are still—as we go to press—*world records*. They are listed below in rough order of likelihood of being surpassed.

Swimming

Men's 100-meter Butterfly—Olympic Record: Mark Spitz (USA), 54.27 sec. (1972); World Record: Matt Gribble (USA), 53.44 (1983). Final: July 30, 4:15 p.m.

Men's 4X100-meter Freestyle Relay—Olympic Record: USA, 3:26.42 (1972); World Record: USA, 3:19.26 (1982). Final: Aug. 2, 5:35 p.m.

Women's 200-meter Individual Medley—Olympic Record: Shane Gould (AUS), 2:23.07 (1972); World Record: Ute Geweniger (GDR), 2:11.73 (1981). Final: Aug. 3, 5 p.m.

Men's 200-meter Individual Medley: Olympic Record: Gunnar Larsen (SWE), 2:07.17 (1972); World Record: Alex Baumann (CAN), 2:02.25 (1982). Final: Aug. 4, 5 p.m.

Track Events

Men's 400-meter Run—Olympic/World Record: Lee Evans (USA), 43.86 sec. (1968). Final: Aug. 8, 4:45 p.m.

Men's 110-meter Hurdles—Olympic

Record: Rod Milburn (USA), 13.24 (1972); World Record: Renaldo Nehemiah (USA), 12.93 (1981). Final: Aug. 6, 6 p.m.

Men's 100-meter Dash—Olympic Record: Jim Hines (USA), 9.95 (1968); World Record: Calvin Smith (USA), 9.93 (1983). Final: Aug. 4, 7:10 p.m.

Men's 200-meter Dash—Olympic Record: Tommie Smith (USA), 19.83 (1968); World Record: Pietro Mennea (ITA), 19.72 (1979). Final: Aug. 8, 6:45 p.m.

Men's 4X100-meter Relay—Olympic Record: USA, 38.19 (1972); World Record: USA, 37.86 (1983). Final: Aug. 11, 4:50 p.m.

Men's 4X400-meter Relay—Olympic/World Record: USA, 2:56.16 (1968). Final: Aug. 11, 5:50 p.m.

Men's 1500-meter Run—Olympic Record: Kip Keino (KEN), 3:34.91 (1968); World Record: Sidney Maree (USA), 3:31.24 (1983). Final: Aug. 11, 6:55 p.m.

Men's 10,000-meter Run—Olympic Record: Lasse Viren (FIN), 27:38.35 (1972); World Record: Henry Rono (KEN), 27:22.04 (1978). Final: Aug. 6, 7:45 p.m.

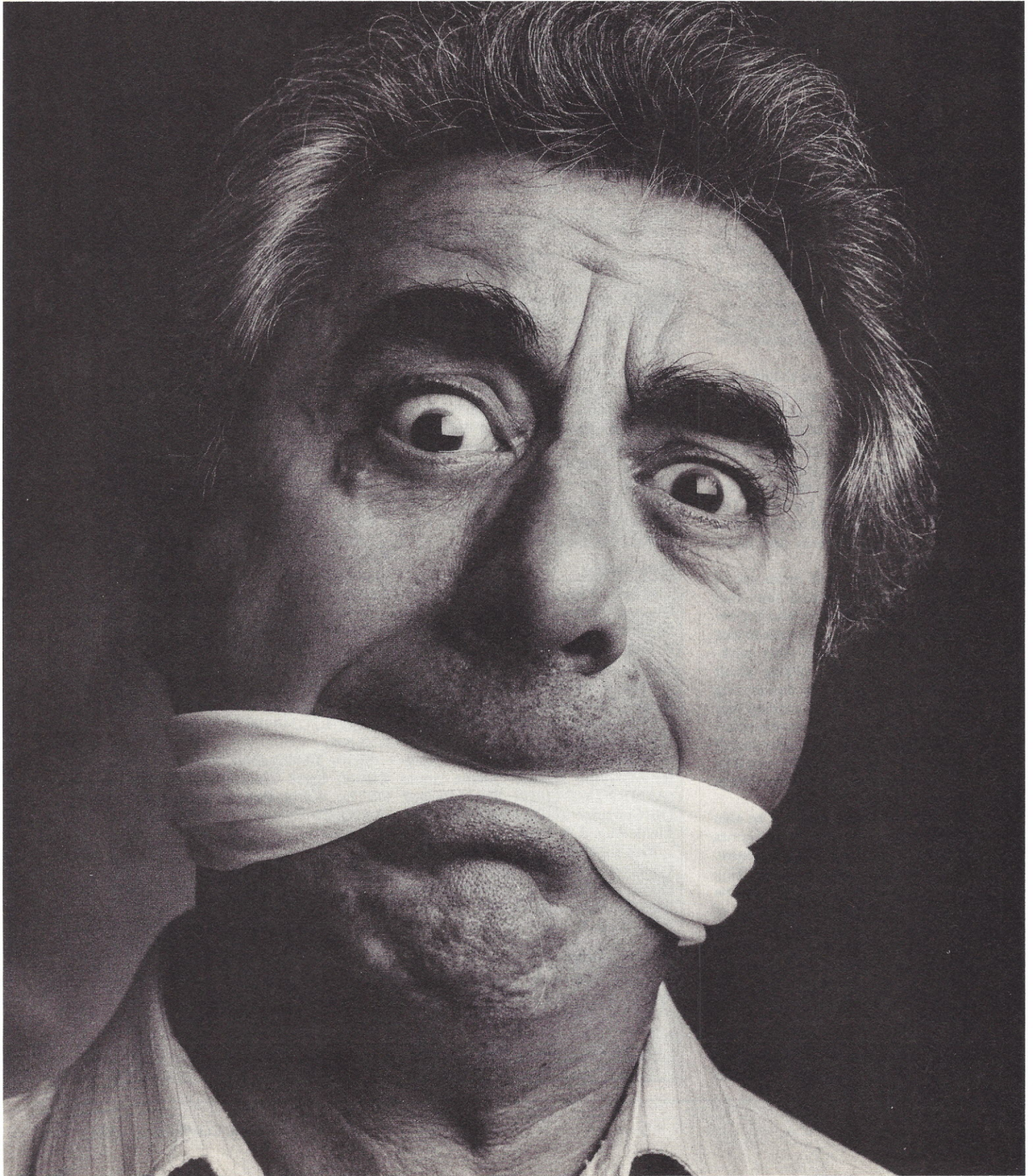
Field Events

Men's Triple Jump—Olympic Record: Viktor Saneyev (USSR), 57' 7.5" (1968); World Record: Joao Oliveira (BRA), 58' 8.5" (1975). Final: Aug. 4, 6 p.m.

Men's Long Jump—Olympic/World Record: Bob Beamon (USA), 29' 2.5" (1968). Final: Aug. 6, 5:40 p.m. (All times PDT)

—K.F.

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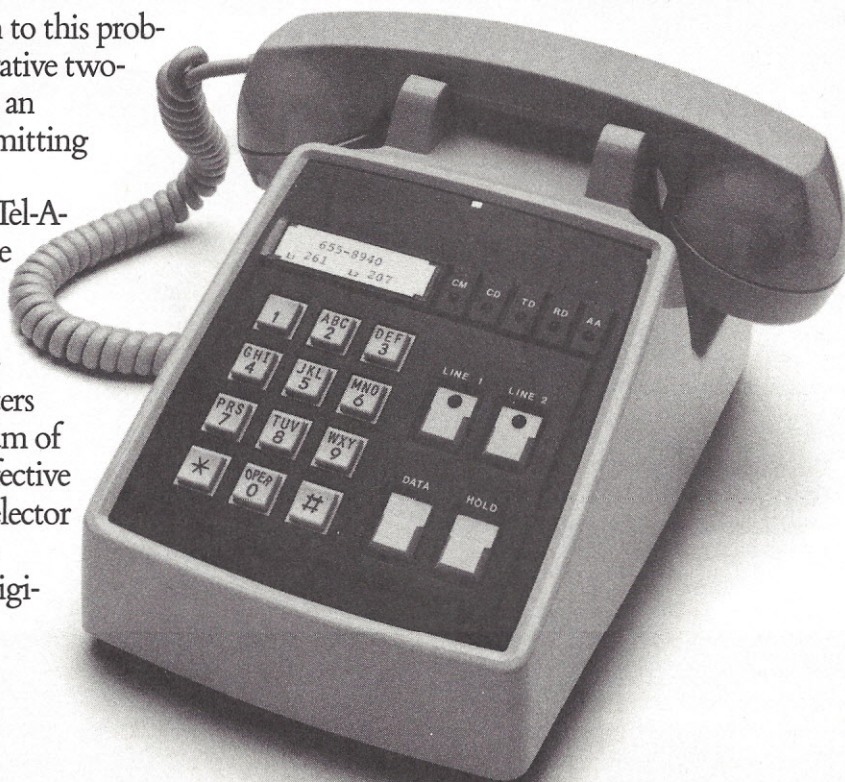
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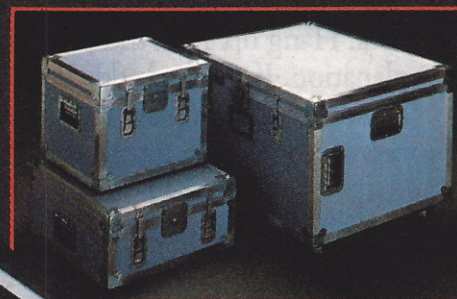
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Graphing an added value

In other staffing situations, Lotus 1-2-3's graphing capabilities have come in handy. When 10,000 athletes arrive at Los Angeles International Airport (LAX) this month, enough staff has to be on hand at the terminals to process their accreditation and accommodations. In other words, if 200 people arrive at 2 p.m., while 600 people arrive at 10 p.m., the committee wants to be sure its staff can handle the flow.

That's where the personal computer comes in. "We polled the different NOCs (National Olympic Committees) to try to find out the size of the delegations and when they'll be arriving at LAX," says Wogahn. "Then

we fed that into the Lotus program so we could track the numbers on a spreadsheet and graphically represent our peak loads over the course of a day, or over the course of time an arrival center is in operation. On the vertical axis of the graph, for instance, 1000 people might be possible for one day. Time will be represented by the horizontal axis, and how that flow is represented will be graphed."

It's easier to understand that way, Wogahn says. "You can see peaks and valleys a lot easier than looking at actual numbers so you can spread those people out," he says. "If we see that the evening is always going to be the heavy time, then we want to put the primary shift in operation at night."

dBASE II, too

dBASE II is another LAOOC favorite. At the start of the Games, for instance, it will be used to keep track not only of some 300,000 articles of clothing ("There are hats and trousers and skirts and blouses and

shirts and coats," says Wogahn, "no socks, but there are shoes."), but also the cost of the completed uniforms. True, Levi-Strauss is donating uniforms, but its gift is not a bottomless pit. At a certain point, the maximum dollar amount it will donate will be reached; the committee must pay for the rest. Therefore, the LAOOC must keep track of the value of what it's handing out. "The personal computer will record each person's uniform, what we give them, and there will be a value associated with that particular article of clothing. That gets applied against a given amount of money that's been donated to us by Levi," explains Wogahn. In other words, the program will track inventory as well as value.

There are many other cases in which the LAOOC either found it necessary to customize off-the-shelf software or write its own programs. One reason for this is that some standard packages didn't perform as the manufacturer claimed.

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CARD READERS—DATA ENTRY AT OLYMPIC SPEEDS

Olympic archery scoring this summer will be computed in less than five minutes—instead of the 30 minutes it previously took—with the help of a card reader attached to an IBM Personal Computer. Many applications can be speeded up by attaching a card reader to a personal computer. By allowing you to enter information from the markings on a card instead of a keyboard, card readers can be a time-saving alternative data entry method.

"Whenever there are large quantities of data, it's going to be a good application of the card reader," explains LAOOC office systems administrator David Wogahn. "It's very easy to hook up and program, and it's very reliable."

"You can use the same document on which you're collecting data to input that data into your personal computer," explains Chuck Warnick, operations manager at the Chatsworth Data Corp. in Chatsworth, Calif., which manu-

factures the card reader being used in the Olympics. "In the old days, you'd fill out a document and give it to a key-punch girl. Then she made the key-punch card needed to enter the card reader—and then you could only do that with a mainframe."

The greatest use of card readers is in the educational market, says Chatsworth's assistant marketing manager Maria Shaw. "Teachers use it for instructional and diagnostic testing," she says. "They also use it for keeping track of attendance, grade reporting and other administrative needs."

Card readers are also used in industrial environments to collect inspection data which is then fed directly into the computer. They can be used for job tracking information, too. If, say, you're manufacturing something that requires a number of steps performed by different people, each person can mark what he or she has done on the

card. That way, a computer can keep track of the status of a particular job in-house, as well as employee productivity. In hospitals, card readers can be helpful for billing purposes; for example, a physician can mark down the time spent with a patient and nurses can mark down medication dispensed. They're also being used in at least one hospital's laundry department.

Chatsworth manufactures card readers for such machines as the Apple, Commodore 64, Radio Shack's TRS-80 and the IBM Personal Computer. The machines are usually connected through an RS-232 serial port. Prices start at about \$1000 for hand-fed models; an automatic feeder, which reads 100 cards a minute, sells for \$1675. The card reader comes with a test scoring program. Other programs are available from a variety of vendors.

—K.F.

age, for instance. "It was so bad," says LAOOC treasurer Conrad Freund, "that we modified it so extensively it's really our own." The package now works flawlessly and is used daily to find out what instruments are maturing whenever bills need to be paid.

Another reason for customizing is that some of the standard programs either lacked the capacity necessary to do the job, or just didn't exist.

The 'Freeway Olympics'

Wogahn cites the transportation system for the "23-Ring Circus" as one example. With competition spread over 23 sites and 200 square miles—as far north as Lake Casitas (canoeing and rowing), 84 miles from downtown Los Angeles, and 110 miles south in Santa Anita Park for the equestrian events—tracking the bus routes for athletes, coaches and officials is no easy task for a personal computer. Add to that the 57 training sites the Olympians will use prior to their events, and you've got a huge transportation system to track. But there was just no room on the mainframes and no software Wogahn knew of to help organize the "Freeway Olympics," as they are being called. So the LAOOC developed its own personal computer software to optimize schedules.

In fact, computers located at the Olympic villages during the games will print out daily schedules for each bus driver.

Keeping score

In the sports arena itself, IBM Personal Computers will be spread around the Olympic competition areas to manage some events, such as finding out who's going to play on what court in tennis (a demonstration sport, which means no medals will be awarded this year), storing statistical information about athletes, and performing statistical analysis functions, such as how many points each player scores in a basketball game.

Statistical data may also be kept on

the performance of the judges, according to IBM's Annette Barden, systems engineer in charge of its personal computers for the Games. "In a sport like gymnastics it's subjective-type scoring," she says, "so they may be keeping statistics as to how an individual judge's score will vary from the mean score."

"Yes, we monitor the judges in our normal evaluation," confirms Rich Kenny of the U.S. Gymnastics Federation, America's governing body for

*In gymnastics,
the computers will
also keep statistics
on how individual
judge's scores vary
from the mean.*

the sport. "It's very important. By computer, you can find somebody who's glaringly out of line." (In effect, the gymnastics federation can't hope for much more than an additional "embarrassment factor" to combat political bias on the part of established judges, who are seldom challenged.)

The personal computer in gymnastics won't only be judging the judges, of course; its main function will be to judge the competitors. As in many areas of Olympic competition, gymnastics requires a lot of number crunching and Gary Frantz of ComputerLand in Allentown, Pa., has developed a program specifically for gymnastics which he'll be running at the Games. In some sports, however, where no program has ever been written to score results, the LAOOC took it upon itself to develop one.

Such was the case with archery. This event is especially complicated to score because 40 or 50 competitors each shoot a round of six arrows at targets—all at the same time. Each of

the arrows is scored with a value of anywhere from one to 10, depending upon where on the target the arrow hits (whether it's a bull's-eye, for example). Then the round must be scored by calculating the results of all 40 competitors' markings on the six arrows and ranking the archers against one another. That's a lot of number crunching but it had always been done by hand.

"We preproduced cards that have the athletes' names and target numbers on them," explains Wogahn. "The scorers will take the cards with them to the targets with the archers and code in with a black pen to indicate the value of each of the arrows on the target for each of the archers. Then the cards will be assembled and brought back to a scoring tent where there will be a personal computer located with a card reader attached. It will read the cards into the personal computer and produce a summary report. From receipt of cards to production of a report, the programming is down to less than five minutes.

Going for a perfect 10

So the personal computer has hit Olympic turf in a big way. But there is a catch. Says Wogahn: "We have to make sure the programs we have are fully tested because they're only going to be in use for a month. They have to be perfect going in; if they don't work right, we're in trouble." (By the way, if you're interested in any of the LAOOC's customized programs, you can contact either Jackie Henderson or Jim Murray at the committee after the Games.)

Still, there will be an element of depression even if not a single glitch surfaces anywhere in the LAOOC's programs. "You've got to be very poised during those 30 days of operation and make sure everything is working properly," says Wogahn. "And after it's all done, you sort of pack it all up and go home." Just like the athletes.

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A Buyer's Guide To IBM Expansion Cards

If you need more power from your IBM Personal Computer or compatible system, a RAM card may be the best choice

by Charles A. Miller, Associate Editor

When you first bought your IBM or IBM compatible personal computer, you probably viewed it as a system that would cover your computing needs indefinitely. But now, even if it has only been a few months, certain inadequacies are becoming apparent. Depending on the types of software you are using, the computing speed and power which originally impressed you now seem insufficient. You spend too much time waiting for the computer to catch up with your intentions. Newer, more powerful programs take up so much of your usable memory that you have little room left for files. These are common symptoms, and buying a new computer is not the only way—or necessarily the best way—to deal with them.

If you need more than your system is giving you, expansion RAM or RAM/multifunction cards—electronic circuits that allow you to add power to your existing, basic IBM or compatible system—may be just what you need. These expansion cards consist of electronic components designed to enhance or increase an existing computer's capability. The basic step is to add usable memory, but many of the expansion cards also carry such additional functions as clock/calendars, game ports, and serial or parallel interfaces.

The manufacturers of IBM computers and popular compatibles have

provided for hardware expansion by including slots on the main—or system—board into which the cards fit. And by making design parameters freely available, these companies have ensured a ready supply of compatible cards from a number of other manufacturers (see chart).

How do you buy RAM expansion cards wisely? What should you look for when buying, say, a 256k card? Should you buy a multifunction card with RAM installed or stick to a single-purpose card that you can add RAM to yourself? The answers hinge on your needs, and fortunately there are only a few basic considerations for choosing nearly every kind of expansion card.

According to Mike Bradley of Maynard Electronics in Casselberry, Fla., makers of the SandStar Memory Card: "The most important thing that you have to do when you shop for any computer part is to be absolutely sure that you know what you want to have done. If you have a firm idea of what the end result you want will be, you don't have to be an expert in software or hardware—if you ask that question right, and make yourself very clear—you should be able to get competent assistance from the representative or the salespeople."

One obvious problem is the basic similarity of claims from one manufacturer to the next. While these products have become more sophisti-

cated as a group, it is often difficult to find clear distinctions. There is not a great deal of difference between some cards—they do the same things the same way.

Don't be dazzled by buzzwords. Ask your dealer how long a particular product has been successfully marketed. Have there been any design changes recently? If the answer to the second question is "no," you can assume the design works—or the manufacturer would have had to quit selling the product or change it in the face of an avalanche of complaints.

But you may want to do a little more detective work. Talk to your dealer—try to find out how many cards of the design you're considering he has sold. It can be risky to get involved with a brand new design, because it may have been pushed into the marketplace with insufficient development effort. So follow the clues carefully.

Quality can vary, but it's difficult for the average buyer to make refined judgements on this kind of hardware. It takes the right kind of equipment, and a certain amount of expertise. A lab test, for instance, can determine the electrical noise—as opposed to the usable signal—level and simulate the varying conditions under which the cards can be expected to run.

Says Maynard's Bradley, "The biggest concern is the actual physical layout on the board itself—if it's not

IBM computers and compatibles provide for expansion with slots on the main—or system—board.

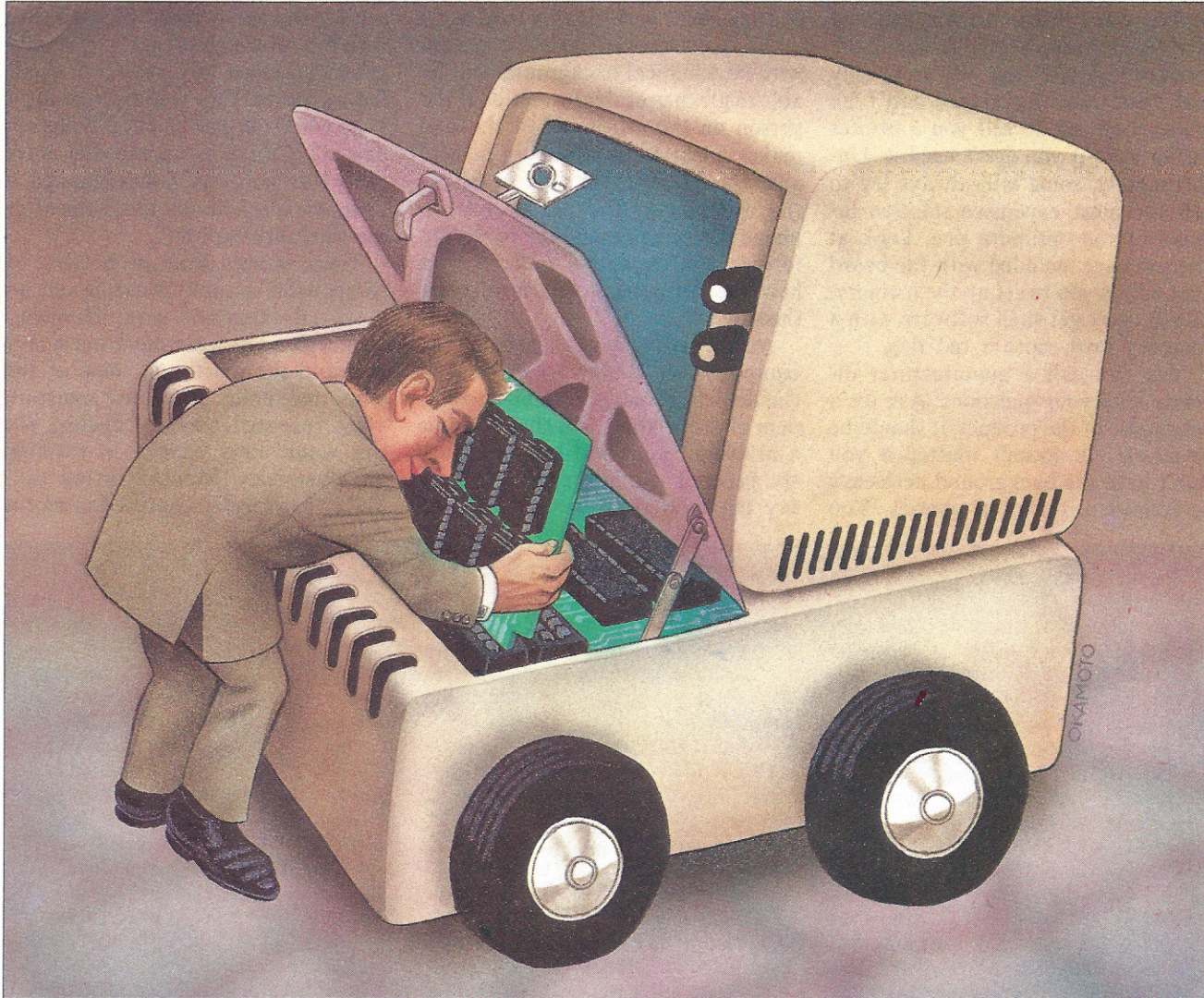


Illustration by Michael Okamoto

tight and neat, you'll get noise. You can design a memory board that functions identically to another and yet when you look at it in a lab with an oscilloscope, it might be noisy and on the verge of failure all the time. If you have too much noise in a chip, then the next chip in line can't determine what the signal should be and you have a failure—the noise can cause the signal to be misread, which results in a memory error, or a data error if you're running a program. It can cause a program to hang or go berserk."

These are not items you can easily

check first hand. But you can get some indications of the quality of components. Becky Rhines, communications director of Persyst Systems, in Irvine, Calif., makers of the Time Spectrum multifunction card, says, "For a RAM board, ask about the kinds of chips that are used. Some manufacturers spot-buy components—they don't consistently use the same component. Check, too, whether cards are tested before they are shipped. That is, are the cards 'burned in' and tested as shipped?"

Look for designs that make it easy to route any plug-in cables, a detail

that pays off when installing the board. Some boards require extra openings at the back of the case. That is, there may be only one port at the back of the card, the rest requiring a opening, which, in effect, takes up space that could be used for another expansion slot.

Don't buy what you don't need. Many people tend to underestimate their computer. For instance, one way to handle printer spooling on an IBM Personal Computer is to put more memory inside the machine, set up to run in the background. Then if you don't use the memory as a printer

buffer, you can use it for something else—you needn't buy a dedicated piece of hardware that can serve only one function. Retailers can't be counted on *not* to sell you a printer buffer even if you don't need it. Unfortunately, some will always try to sell the most expensive solution instead of the optimum one. Look at the software included with the board that allows you to set up the memory. If you don't get such software with a memory card, raise a red flag.

You can call a manufacturer directly with your questions. Ask for a schematic of the product; it should be available. It doesn't matter if you don't have the background necessary to formulate technical queries. You

can ask about performance in general terms, too. Even an average person with no technical background will be able to glean useful information if the person on the other end of the line makes an attempt to supply helpful answers. You may be able to tell by the attitude of the people on the phone how much help they're willing to give—an important indication of how they're going to perform after the sale.

Ask whether you can have the equipment on an evaluation basis—if the dealer or manufacturer is confident of the product, this should not be a problem. Some will let you return the product within a specified time, say ten days or two weeks. If you

can't purchase a piece of hardware with full return privileges, you should know the reason why. Also, ask about the warranty. Can you arrange for a swap while the equipment is being repaired? Can you extend the warranty? If not, can you exchange a board for a remanufactured one after the warranty expires?

There is very little probability of components actually wearing out on a typical expansion card. However, connectors can wear out from heavy use, and the plastic on some of the chips may crack and admit moisture after repeated thermal cycles, but this would only happen in extreme circumstances. Manufacturing reliability has greatly improved in recent

DO-IT-YOURSELF COMPUTER EXPANSION

Here are a few tips to help make do-it-yourself installation of an expansion card less worrisome, including some you aren't likely to find in the manual:

Most expansion cards are not hard to install on IBM (and compatible) computers. But there are a few precautions. Even professional repairmen sometimes forget to turn off a machine, so *always unplug it* before you start any installation job. Severe damage to both the expansion card and the host system can result when the card is inserted or removed while the power is on. Also, take steps to work in an area that is free of static electricity.

The only tool you'll generally need is a screwdriver, though you may want to have a pair of pliers on hand. If you're going to readjust memory chips, you'll need a chip puller (commonly available at electronic parts supply stores).

Carefully remove screws or loosen clamps on the cover and lift it off. Inside the machine you will see slots on the system board. To the rear of the slots are openings in the computer case through which plugs or cables extend.

The expansion cards fit into the slots on the system board—be sure you have selected the correct slot, based on the recommendation of the card manufacturer. In nearly every case the chips

and other major components of the expansion card are all on the same side of the card and that side is generally on your right as you face the rear of the computer case.

When inserting chips on empty-socket RAM cards or adding to a partially filled card, be sure the notches on the chip and the socket itself align properly—it's easy to install the chip incorrectly. Chips that are installed backward will be destroyed when the power is turned on. You can verify the orientation by comparing the added chips to those already installed on the card. And make sure you don't bend the pins by always being sure that the pins are in the socket before pushing down on the chip.

Make sure you fill rows in order. If you add more than one row of chips, check the card after each row (with the diagnostic routine of the computer, if equipped). Remember though, that some companies won't honor the warranty on cards that have had memory installed by the user—especially if you use chips that are not recommended by the manufacturer.

Remove any plates or other covers on the back casing. Inspect the slot on the system board to see that it is cleaned and in good order. Be sure, also, that DIP-switch settings correspond to the

manufacturer's directives on both the card and the system board—this is especially critical when adding memory.

Plug the card in firmly and carefully, being sure the front end fits into the guides or supports on the inner face of the case (if any) and the rear end fits into (or aligns with) the case opening at the back. Be sure the connector strip on the bottom of the card is evenly seated in its slot. If you have to plug in cables on the card, make sure the alignment is right—be sure none go in upside down. If any extend through the case, be sure to dress the cables so they don't interfere with or put stress on other components, and be sure there are no crimps in the wire.

When making an installation on some of the IBM compatibles, the procedure may differ from that in the instructions. A speaker wire, for instance, may not be routed where it is shown in the instruction manual. If it seems to cause a problem, you should call the manufacturer for advice.

Carefully put the computer's cover back in place and fasten securely. Turn the machine on. If you're running an IBM machine and you've added memory, you'll notice that the diagnostic routine will take a little longer, but once you get past the initial tests you should have smooth sailing.

"It's a good idea to have the capability to add to the card as your applications grow."

years; in fact, you can realistically expect that if the equipment survives for 90 days, it should give good service for a year.

Above all, look for cards that are demonstrably capable of doing what you want them to do. And be aware of hidden disclaimers. For example, installing memory chips on your own may invalidate the warranty on some manufacturers' products.

Don't buy on price alone. Look for cards that allow you to expand as your needs change. Don Balthaser, technical representative with STB Systems, in Richardson, Tex., makers of the Super Rio multifunction card, says, "It's a good idea to have the capability to add to the card as your applications grow." A concept gaining in popularity—especially for RAM cards classed as multifunction boards—is modularity. With modular cards, sockets are provided to plug in additional components at a later time. You can add printer interfaces or clock/calendars to a RAM card when the need arises. This may not be the most cost-effective way of adding functions, however. The cost for a dedicated board with the functions already installed may actually be less than the total for add-ons in a modular setup.

Another item that can shed some light on the value of a product is the quality of its documentation. It should contain well thought-out illustrations and a comprehensive index. The instructions should be easy to understand and comprehensive. They should describe ways to alternately configure the cards, such as varying the setting of DIP switches.

Remember, though you may not have planned for it initially, your IBM and most IBM compatible computers are conveniently expandable. You can use slots to build on the system, but plan how you use the slots carefully—the more you occupy the fewer you'll have for further expansion. If you have no more slots, you have no more room to grow.

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512K Ram Board	John Bell Engineering, Inc.	\$120/0k \$160/64k \$320/320k \$360/384k \$540/512k	RAM	90 days	0k	512k
ABM Memory Board	ABM Computer Systems	\$295/64k \$395/128k \$595/256k \$695/320k \$795/384k \$995/512k	RAM,	1 year	64k	512k
ABM Superboard	ABM Computer Systems	\$295 to \$945 (depending on module and RAM options)	Clock/calendar, game port, parallel I/O, RAM, serial I/O	1 year	64k	384k
ADDRAM Elite	Profit Systems, Inc.	\$475/64k	Clock/calendar, serial I/O, RAM, parallel I/O	1 year	64k	512k
ADDRAM Plus	Profit Systems, Inc.	\$475/64k	Clock/calendar, 2 serial I/O, RAM	1 year	64k	512k
APPARAT 512 RAM CARD	Apparat, Inc.	\$189/64k	RAM	1 year	64k	512k
Baby Blue	Microlog	\$395/64k	Z80 microprocessor, RAM	90 days	64k	
Baby Blue II	Microlog	\$695/64k \$795/128k \$895/192k \$995/256k	Clock/calendar, parallel I/O, RAM, serial I/O	90 days	64k	256k
BUSBOARD	LNW Computers	\$230/0k \$350/64k (other prices vary depending on module and RAM options)	Game port, modem, parallel I/O, RAM, serial I/O	1 year	0k	564k
Byway 100	BYAD, Inc.	\$1000	Z80 microprocessor, RAM, serial I/O	1 year	64k	
Captain Multifunction Board	TECMAR	\$349/0k \$389/0k \$479/128k \$633/256k \$795/384k	Clock/calendar parallel I/O, RAM, serial I/O	1 year	0k	256k
CI-PCM	Chrislin Industries, Inc.	\$285/0k	RAM	1 year	0k	256k
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DS2	BYAD, Inc.	\$895	Z80 micro processor RAM, serial I/O	1 year	64k	

BUYER'S GUIDE

PRODUCT	COMPANY	PRICE	FUNCTION(S)	WARRANTY (length)	MEMORY (standard)	MEMORY (max.)
Dynamic Memory Board	TECMAR	\$289/64k \$369/128k \$439/192k \$489/256k	RAM	1 year	64k	256k
1stMATE Multifunction Board	TECMAR	\$319/0k \$389/64k \$469/128k \$589/256k	Clock/calendar, parallel I/O, RAM, serial I/O	1 year	0k	256k
Genie+ 192k Memory Expansion	MA Systems, Inc.	\$179/0k \$269/64k \$429/192k	RAM	2 years	0k	192k
Genie+ 384k Multi-function Adaptor	MA Systems Inc.	\$289/0k \$389/64k \$489/128k \$689/256k \$789/384k	Clock/calendar, parallel I/O, RAM, serial I/O	2 years	0k	384k
Handi-1	Apstek, Inc.	\$275/0k \$369/64k \$459/128k \$549/192k \$639/256k	Clock/calendar, parallel I/O, RAM, serial I/O	1 year	0k	256k
Handi-1 Plus	Apstek, Inc.	\$305/0k \$395/64k \$485/128k \$575/192k \$665/256k \$755/320k \$845/384k	Clock/calendar, parallel I/O, RAM, serial I/O	1 year	0k	384k
Handi-2	Apstek, Inc.	\$179/0k \$269/64k \$359/128k \$449/192k \$539/256k	RAM	1 year	0k	256k
IBM 64/256k Memory Expansion Card	IBM	\$350/64k \$515/128k \$680/192k \$849/256k	RAM	90 days	64k	256k
IDEAGraph	IDE Associates, Inc.	\$995/128k/ 24 MHz \$1495/128k/ 40 MHz \$1395/256k/ 24 MHz \$1895/256k/ 90 MHz	Video with RAM	1 year	128k	256k
IDEAMax	IDE Associates, Inc.	\$320 to \$795 (depending on module and RAM options)	Clock/calendar, game port parallel I/O, RAM, serial I/O	1 year	64k	384k
IDEAPlus	IDE Associates, Inc.	\$320/64k (depending on module and RAM options)	Clock/calendar, parallel I/O, RAM, serial I/O	1 year	64k	256k
IDEAPlus	IDE Associates, Inc.	\$320 to \$610 (depending on module and RAM options)	Clock/calendar, parallel I/O, RAM, serial I/O	1 year	64k	256k

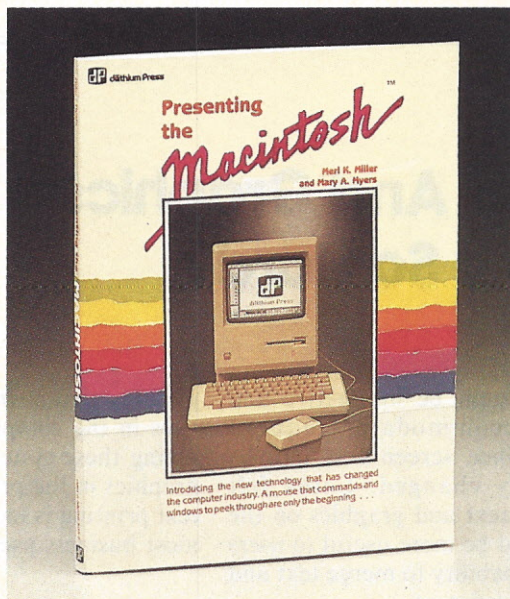
PRODUCT	COMPANY	PRICE	FUNCTION(S)	WARRANTY (length)	MEMORY (standard)	MEMORY (max.)
JRAM-2	Tall Tree Systems	\$219 to \$799 (depending on module and RAM options)	Clock/calendar, parallel I/O, RAM, serial I/O	1 year	0k	512k
Little Red RAM	Microlog	\$349/64k \$399/128k \$449/192k \$499/256k	RAM	90 days	64k	256k
MAI Board	Amdek	\$499	Video with RAM	1 year	64k	
Maxicard	Vista Computer Co., Inc.	\$274/64k \$999/576k	Video with RAM	1 year	64k	576k
Maximizer	Sigma Designs, Inc.	\$395/64k	Clock, parallel I/O, RAM, serial I/O	1 year	64k	512k
MegaPlus II	AST Research, Inc.	\$395/64k \$495/122k \$595/192k \$695/256k	Clock/calendar, parallel I/O, RAM, serial I/O	1 year	64k	512k
Memory Expansion Board	Ontrax, Inc.	\$98/0k \$150/64k \$202/128k \$254/192k \$306/256k	RAM	1 year	0k	256k
Multicard Plus	Vista Computer Co., Inc.	\$395/64k \$895/384k	Clock/calendar, game port, parallel I/O, RAM, Serial I/O	1 year	64k	384k
New Improved Quadboard	Quadram	\$295/0k \$395/64k \$675/256k \$795/384k	Clock/calendar, game port, parallel I/O, RAM, serial I/O	1 year	0k	384k
Orchid Blossom	Orchid Technology	\$395/64k	Clock/calendar, Serial I/O, parallel I/O	1 year	64k	384k
PC/Multi-Card	Personal Computer Products, Inc.	\$345/0k \$595/256k	Clock/calendar, parallel I/O	90 days	0k	256k
PS-ICP	ABM Computer Systems	\$995	Z80 microprocessor, parallel I/O, RAM, serial I/O	1 year	64k	
Quad 512+	Quadram	\$325/64k \$550/256k \$895/512k	RAM, Serial I/O	1 year	64k	512k
Quadboard	Quadram	\$295/0k \$395/64k \$4595/256k	Clock/calendar parallel I/O, RAM, serial I/O	1 year	0k	256k

BUYER'S GUIDE

PRODUCT	COMPANY	PRICE	FUNCTION(S)	WARRANTY (length)	MEMORY (standard)	MEMORY (max.)
Quadboard II	Quadram	\$295/0k \$395/64k \$595/256k	Clock/calendar, parallel I/O, RAM, serial I/O	1 year	0k	256k
Quadram Memory Board-192k	Quadram	\$425	RAM	1 year	192k	
Quadram Memory Board-64k	Quadram	\$275	RAM	1 year	64k	
RAM+	Seattle Computer	\$295/64k	Serial I/O, RAM	1 year	0k	256k
RAM+3	Seattle Computer	\$395/64k	Clock, parallel I/O, RAM, serial I/O	1 year	0k	256k
Rio Plus	STB Systems	\$395/64k \$665/256k \$845/384k	Clock/calendar, game port, parallel I/O, RAM, serial I/O	1 year	64k	384k
Six Pack Plus	AST Research, Inc.	\$395/64k \$495/128k \$595/192k \$695/256k \$895/384k	Clock/calendar, game port, parallel I/O, RAM, serial I/O	1 year	64k	384k
STBI56	STB Systems	\$565	RAM	1 year	256k	
STBI384	STB Systems	\$745	RAM	1 year	384k	
STBI64	STB Systems	\$295	RAM	1 year	64k	
SandStar Memory Card	Maynard Electronics	\$199/0k \$274/64k \$349/128k \$424/192k \$499/256k (module prices vary from \$49 to \$95)	Clock/calendar, game port, parallel I/O, RAM, serial I/O	1 year	0k	256k
Super Rio	STB Systems	\$419/64k	Clock/calendar, game port, parallel I/O, RAM, 2 serial I/O	1 year	64k	768k
System Card	Microsoft	\$395/64k \$625/256k	Clock/calendar, parallel I/O, RAM, serial I/O	1 year	64k	256k
Time Spectrum 384 Series	Persyst	\$395/64k \$495/128k \$595/192k \$695/256k \$795/320k \$895/384k	Clock, parallel I/O, RAM, serial I/O	1 year	64k	384k
Titan Multifunction Board	Titan Technologies	\$556/64k \$636/128k \$716/192k \$796/256k \$876/320k \$956/384k \$1196/576k	Clock/calendar, parallel I/O, RAM, 2 serial I/O	1 year	64k	576k
VersaCard	SRITEK, Inc.	\$995/256k \$1595/512k	RAM (optional 68000 microprocessor)	90 days	256k	512k
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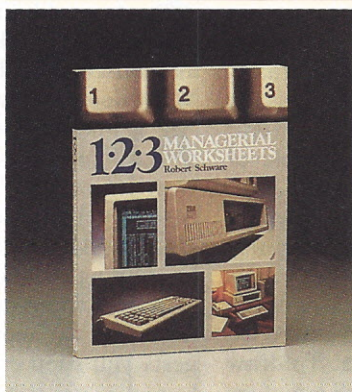
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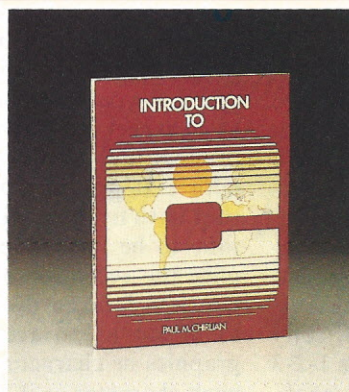
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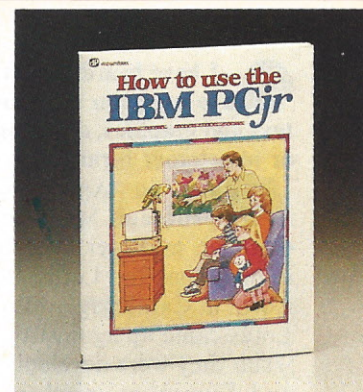
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CIRCLE 114

Merging Text And Graphics: Why Is It So Hard?

If you have questions dealing with hardware, software, or applications, Personal Computing will answer them in this monthly column. Please send your 'need-to-knows' to: Answers, Personal Computing, 10 Mulholland Drive, Hasbrouck Heights, New Jersey 07604.

Q: I have heard that it is difficult to program software to merge text and graphics, either on the screen or in printout form. Why is this?

A: For an explanation of this problem, we went to Ezra Gottheil, manager of technical communications for Lotus Development Corp. in Cambridge, Massachusetts. Lotus came up against this difficulty when they were developing the 1-2-3 and Symphony productivity packages, both of which have some capability for merging text and graphics on the screen.

Lotus's Symphony package can be set up to integrate text and graphics on the screen at the same time, while with 1-2-3, you have to toggle back and forth between text and graphics modes or use two different screens. Neither package can merge text and graphics on a printout, though text and graphics created with either package can be printed—separately. (An additional program is needed to print graphics created with 1-2-3 or Symphony.)

Gottheil says Lotus concentrated on developing a way to merge text and graphics on the screen rather than on a printout. They reasoned that for tasks requiring a merge of text and graphics, it was important

that the system be interactive and able to accommodate frequent changes. Since screen text can be more easily changed, Lotus felt merging of text and graphics on the screen would be more useful to users than the capability to merge text and graphics on printout.

According to Gottheil, the nature of data is different for text and graphics, and the peripheral—whether a screen or a printer—is set up to expect one type of data. Several printers and screens are capable of both text and graphics modes, but they have to operate in one mode at a time to be most effective. "To simplify the reception of images," says Gottheil, "the hardware device tends to be set up to accept bit-mapped graphics or character data. To draw each character as if it were a picture takes a lot more time, and you need more data going to the device."

A bit-mapped image in the computer's memory consists of individual bits that correspond to individual dots in the design. Since a character consists of a specific unchanging dot pattern, it is easier to represent characters by a code. Each symbol (stored in the computer as a byte with an eight-bit configuration that represents that symbol) in the code corresponds to a specific character consisting of a specific dot pattern. "You can tell the device to do a lot more with a single byte in text mode," says Gottheil. This factor allows text transmitted by ASCII codes to print faster than data transferred from a bit-map.

Some systems combine with special printers to print characters as

pictures, that is, from bit-mapped images in the computer's memory, enabling these systems to mix text and graphics in the printout. This type of text printing is too slow, however, for most business uses.

Q: I would like to upgrade my Apple II Plus for lowercase and 80-column display capabilities. What does that involve?

A: The best way, according to John Morand of the Applesseed User's Group in Worcester, Mass., is to buy an 80-column board which also has lowercase capability. This board plugs inside the computer, and a cable coming out of it can be connected to the monitor. Morand suggests you shop carefully for a board to make sure it has both capabilities.

If you have already purchased a board that gives you 80 columns, but does not provide lowercase capability, or if you are only interested in lowercase capability, you can get an upper-/lowercase chip which replaces the character generator chip in the Apple II Plus. This chip is available from the Dan Paymar Co., located at 91 Pioneer Dr., Durango, CO 81301; (303) 259-3598.

Q: Is the Macintosh programmable in BASIC, or will I need to learn some type of machine or assembly language in order to program on that computer?

A: According to Kathleen Dixon, corporate communications representative for Apple Computer, the Macintosh does not have the

built-in programming capability that Apple II products have. But the machine will run programming languages, just like any other computer. You will have to purchase utility programs. As this issue went to press, Apple planned to offer a Pascal program in June, a BASIC program in late July or August, and assembly language sometime in September.

Q: I am a music teacher, and I want to find programs that will help teach basic through advanced music theory and music composition on the IBM Personal Computer or XT. I have found suitable programs for the Apple and compatibles, but nothing for the IBM.

A: While music-teaching software for the IBM is not plentiful, a search through various software catalogs turned up a pair of programs that may be particularly well-suited to your needs.

EduMusic I and II from Europro, Inc., teach music theory and composition on an IBM Personal Computer with 64k, under PC-DOS version 1.1. They require the use of a color/graphics adaptor board, though you can use a black and white or a color monitor with them.

EduMusic I teaches theory, notation, rhythms and patterns, symbols, terms, melody, chords, accompaniment, and major and minor keys. Priced at \$80, EduMusic I includes another package called Keyboard Piano, which converts the IBM keyboard into a piano keyboard.

EduMusic II builds on what was learned in I, and teaches patterns and variations, harmonies, upbeats, trills and turns, composing and transposing, music history, and sight reading. It retails for \$60, and you can purchase I and II for \$110. Europro, Inc., is located at 129 Saratoga, Petaluma, CA 94952; (707) 763-9700.

Songwriter, from Scarborough Systems, "tries to give a sense of the organization, structure, and thinking

that's behind music, so that in fact kids can begin to think like musicians as they learn the program," says Art Bardige, co-author of the program. Songwriter lets students compose and print out music, and is designed to take students from simple to sophisticated musical constructions. The IBM version of Songwriter retails for \$49.95. Scarborough Systems is located at 25 N. Broadway, Tarrytown, NY 10591; (914) 332-4545.

Elements of Music, from Electronic Courseware Systems, drills on note names, pitches on the keyboard, and key signatures. There is also an aural skills trainer which drills on identification of music intervals; and recognition of basic and dominant seventh chords. The entire Elements of Music package, which includes a program for student record-keeping, retails for \$99.95. Individual lessons can be purchased for \$39.95. Electronic Courseware Systems, Inc., is located at 309 Windsor Rd., Champaign, IL 61820; (217) 359-7099.

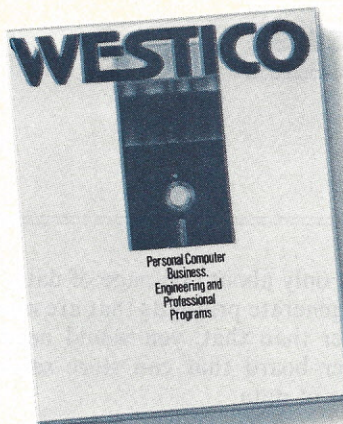
Q: What is a buffer, and what is it used for?

A: Randy Bullard, technical support representative for Quadram Corp. (Norcross, Ga.), a manufacturer of buffer boards and other computer products, defines a buffer as "a device that goes between a computer and a printer to aid in freeing up the computer. Computers can send information to a printer faster than the printer can print," explains Bullard. "Normally, the computer cannot be used for other tasks while the printer is printing.

"A buffer stores data from the computer as fast as the computer can send it. The buffer then continues to send data to the printer at the printer's speed. This frees the computer, making a buffer a true time-saving device."

Buffers differ in the amount of text they can store. Some printers have built-in buffers, but they usually

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CIRCLE 191

ANSWERS

store only about one page of data. If you generate printouts that are much longer than that, you would need a buffer board that can store several pages of data.

Q. I've seen advertisements for both data base management software and filing software. Is there any difference between the two?

A. Yes there is, says Don Rogal, vice-president of software development at Chang Labs, and author of FilePlan, an electronic filing package. "Both filing software and data base management software work with collections of related data known as files," says Rogal. "Examples include customer lists and expense records. But electronic filing software works with one file at a time while a data base package allows the interaction of several files simultaneously.

"Today's data base software is often powerful but very difficult to use," says Rogal. "A good electronic filing package can be learned in an hour or two, yet can be useful for all kinds of personal and business lists."

There is usually a price difference between these two kinds of software as well. Generally, filing-type software costs in the \$100 to \$300 range, while data base management software runs from \$300 to \$800. FilePlan for example, costs \$295.

Q. Can I use files I created in AppleWriter with my new word processing package, Word Juggler IIe? And can I use AppleWriter on my Apple IIe with Word Juggler's physical keyboard modifications?

A. Yes to the first question, says Tom Sine, technical support specialist for Quark, makers of Word Juggler. You can use these files even though AppleWriter was written under the DOS 3.3 operating system and Word Juggler was written under ProDOS. Word Juggler includes a

utilities program on the disk to simplify the process.

To load DOS 3.3 files, you must get into Word Juggler's edit mode and type "open apple-1". This will bring you to the Word Juggler utilities menu, which contains eight options. Select "Insert DOS 3.3 text file". The program will then ask you to put your data disk in the drive, hit "?" for a listing of all the files on that disk and type the file name you wish to access. Word Juggler will load it automatically. Once you've got the program loaded, you can save it under Word Juggler. It's that simple.

In answer to your second question, Brenda Wood, product marketing manager for AppleWriter II, says, "Probably not." The keyboard modifications make changes to some of the control key sequences. When AppleWriter was written, it was not written to be compatible with Word Juggler, Wood says.

Q. Surge suppressors with five or six outlets seem to be expensive. Can a surge suppressor with two outlets support a string of devices by plugging a multi-outlet strip into one of the two outlets of the surge suppressor?

A. That is not a wise procedure, according to Jim Garrity, product support manager of Electronic Protection Devices, Inc., of Waltham, Mass., a manufacturer of power and security devices. Garrity gives two good reasons for not connecting a multi-strip outlet into a surge suppressor.

First, the surge suppressor cannot protect against a short or other faulty electronics in the multi-strip device. The suppressor works with the signal coming from the line and going into your computer components, and a multi-strip outlet is an added go-between that the suppressor does not account for. Since a two-outlet surge suppressor can't protect against disturbances in a multi-outlet strip, if

you want to plug more than two components into a surge suppressor, you have to have a larger number of outlets in the surge suppressor itself to guarantee protection.

Second, there's a difference in the number of amps between a two-outlet surge suppressor and a six-outlet unit. A two-outlet surge suppressor is usually rated at 10 amps, says Garrity, while one with six outlets is rated at 15 amps. So plugging too many devices into a two-outlet suppressor via a multi-outlet strip could cause an overload in the suppressor.

Garrity estimates the price difference between a two-outlet and a six-outlet surge suppressor at about \$30, and adds, "you get what you pay for" in terms of protection.

Q. What do the different numbers on MS-DOS mean? I have an Eagle PC-II, which comes with MS-DOS 1.25, and I want to know if I can use software labeled MS-DOS 2.0.

A. The different numbers are simply different versions of the same program. As software gets updated and improved, the numbers get higher. MS-DOS 2.0, for example, is a newer version of the program than MS-DOS 1.25.

According to Frank Weikel, director of corporate communications for Eagle Computer, "No, the 2.0 DOS will not run on the PC-II (as is). But users can get an upgrade from their Eagle dealer that will allow the PC-II to run 2.0 DOS."

Q. Will MasterType, which I know runs on the IBM Personal Computer, run on my IBM PCjr?

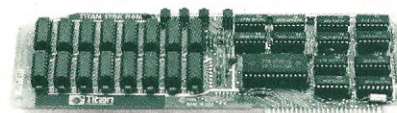
A. No. The IBM Personal Computer version of MasterType will not run on the PCjr, says Anne Morgan, customer service manager for Scarborough Systems, manufacturers of MasterType. But by the time you read this, a new version of the program will be available.

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CIRCLE 189



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In general you'll find that some software designed for the Personal Computer won't run on the PCjr because the smaller machine doesn't have as much memory as the Personal Computer, the software requires a disk drive, and the graphics capabilities of the two machines are different. In addition, IBM itself has acknowledged that the PCjr's keyboard was not intended for intensive typing applications.

Q: I'm looking for a modem for my Apple IIe. Do the modem programs come with the modem? Will the Smartcom I program work with any modem, or just Hayes modems?

A: First, the Smartcom I program will work with only the Hayes Micromodem IIe, reports John Davis, customer service representative for Hayes Microcomputer Products.

As for your other questions: Modem programs, commonly referred to as communications software, will be necessary in order to transmit information over a modem. Communications software allows you to tell your computer whether you are sending or receiving, and what information you wish to send. The computer then directs the modem to dial the telephone number to which you're connecting. The modem connects with the telephone, which then sends signals over the telephone line and communicates with the telephone at the other end. That telephone signals to the receiving end's modem, which connects to its computer, which eventually brings a message to the person on the other end (who is also using communications software).

Communications programs are sometimes included with your modem purchase, sometimes not. According to Davis, it varies from manufacturer to manufacturer. It can even vary within one company. Hayes, for example, packages their Smartcom I program together with

the Hayes Micromodem IIe. The Hayes Terminal Program, however, is packaged separately from any modems.

The reasoning stems from the two different modem types: internal and external. When a company sells an internal modem, they know which computer it is designed for, hence they know which version of the software to include with the modem, Davis says. An external modem, however—such as the Smartmodem 300 and Smartmodem 1200—can be used on any number of computers. The manufacturer wants to give the customer the flexibility to choose the software for his or her own particular computer.

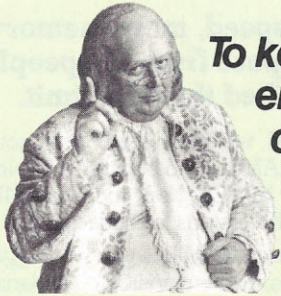
Before you buy, remember there are different levels of communication software available. Just be aware of how you hope to use telecommunications—whether to simply connect to an informational data base, or to send files to someone—before you make your purchase.

Q: Should my kids become computer literate, and if so, why?

A: According to John Weingarten, assistant manager of Mission Computer Centers in Mountain View, Calif., computers *will* be quite different by the time young children reach the job market. "I don't advocate learning BASIC programming as the means to a future career in computers," he says. "However, there are some very real and important things computers can do for children. There are new programming languages designed as interactive educational environments where children can learn problem solving skills in a way no teacher or workbook can duplicate. Logo is such a language, and I feel very strongly that any child who isn't exploring Logo is missing out on the greatest educational opportunity of our age.

"Even if Logo didn't exist," he continues, "word processing for children

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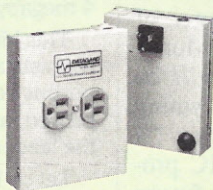
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(609) 456-5400 **Outside NJ (800) 257-8384**

GEMS OF WISDOM

Access Your Speller With Ease

I use MicroPro's WordStar word processing program and Oasis's The Word Plus spelling checker in my work as a freelance writer. Normally, when I want to access the spelling program, I choose the R (Run a Program) option from the No File Menu. Then, on the prompt, I type TW to begin the use the speller.

If I had bought MicroPro's own SpellStar, however, I could have directly activated the spelling program by hitting the S key from the No File Menu. One day, I did hit the S key and received an error message which said, in part, "FILE SPELSTAR.OVR NOT FOUND." So I renamed TW.COM as SPELSTAR.OVR. I returned to the No File Menu, hit S, and was delivered right into The Word Plus program.

Robert W. Bone
KAILUA, HI

This Gem of Wisdom wins \$25 for Robert W. Bone. If you have an anecdote, tip or secret to share, send it (up to 250 words) to Gems of Wisdom Editor, Personal Computing, 10 Mulholland Dr., Hasbrouck Heights, NJ 07604.

Japan's Fifth Generation Project and the American Response

Coming to your local PBS station, the week
of July 23rd on The Computer Chronicles



The Computer Chronicles, television's first series for computer users, documents Japan's bid for technological supremacy in the 1990's.

Featuring:

Dr. Kazuhiro Fuchi, Director of the Fifth Generation Project
Prof. Hideo Aiso, Chairman, Computer Technology Task Force.
Prof. Tohru Moto-oka, Chairman, Fifth Generation Project steering committee.

Dr. Hiroshi Kashiwagi, Director, Electrotechnical Laboratory.
Admiral Bobby Ray Inman, Director, Microelectronics and Computer Technology Corporation.

Ed Feigenbaum, Prof., Stanford University.

Gary Kildall, CP/M creator.

Stewart Cheifet, PBS Silicon Valley Correspondent

Check your local PBS station for day and time in your area.

The Computer Chronicles schedule for July:



July 2, UTILITIES with Peter Norton
July 9, GAMES with Bill Budge & Steve Kitchen
July 16, PEOPLE with Steve Wozniak & Adam Osborne
July 23, FIFTH GENERATION
July 30, SUPER COMPUTERS

Major funding for The Computer Chronicles is provided by Microfocus, Inc.

would be enough of a reason to provide every school-age child with his or her own personal computer. Giving children the ability to edit their schoolwork on the screen before it is printed greatly enhances the quality of their writing and saves them countless hours, which they can use to learn even more. Perhaps children don't need to become computer literate, but if computers can be helpful with their 'conventional' schoolwork, why not use them?"

Q: I have an IBM Personal Computer. Is there a command that can be executed from BASIC which is an equivalent to hitting the Caps Lock key?

A: According to Jim Slaight, information representative at IBM, the following two-line command should solve your problem:
DEF SEG=0
POKE&H417,&H40

Q: I'm a CompuServe subscriber and want to upload data to the CompuServe network storage from my office computer (an Epson QX-10) and download it to my TRS-80 at home using my modem. How would I go about this and what additional equipment would I need?

A: According to Epson, all you will need for the QX-10 part of the operation is communications software. The communications software included with your Epson QX-10 purchase will be fine.

For the TRS-80 side of things, David Frager, product manager for the TRS-80 Model I, says Radio Shack sells a package called Videotex Plus for the Model I, which allows for uploading and downloading of files. This program is disk-based, so it obviously requires that you have a disk drive. "We don't sell any program for the Model I cassette machine that allows uploading and downloading," Frager says.

Since you already have a modem at home, and you are a CompuServe subscriber, the only other thing you'll need is your password and you should be on your way.

Q: I am interested in using my TI 99/4A for language instruction—in particular, German. Is software available for this application?

A: Control Data Publishing, maker of the Plato series of software, offers The German Vocabulary Builder for the TI 99/4A for \$49.95. You'll also need to buy the \$50 "interpreter cartridge" to run the Plato series.

The program is designed for the junior/senior high school level, according to Control Data. The lessons contain various games to encourage learning, and provide practice in both English to German and German to English. You can purchase the program at a dealer, or order directly from the company by calling (800) 233-3785.

For additional software, you might try joining a local user's group of TI 99/4A owners. They may know of some public domain software that teaches German. You could also contact the International 99/4 Users Group, P.O. Box 67, Bethany, OK 73008. This group publishes a magazine and has a large list of software you can get your hands on for little or no money.

Q: With the recent divestiture of Bell Telephone, there has been an increased availability of low-cost, single-piece telephones. It appears that the standard two-piece units may become outdated, and I would like to know if modems are being produced to keep pace with the new changes and advancements in telephone technology.

A: According to John Davis, customer service representative for Hayes Microcomputer Prod-

ucts, "With our modems, the telephone is not even a consideration anymore." The popular modems of five or six years ago, he says, used an "acoustic coupler" in the transmission process. The user would pick up his or her telephone and put the receiver into a box with a speaker in it; the data was then taken straight from the phone lines.

"Most modems nowadays don't even use the acoustic coupler," Davis says. "It's an outdated technology." Today you plug the modem directly into the computer and the wall phone jack (using a thin cable), and bypass your phone completely, Davis says. "All you're using are the telephone wires, not your telephone."

Q: What does LAN stand for and what does a LAN do?

A: LAN stands for Local Area Network, which is a communications system that links personal computers and allows them to exchange information and share resources, such as a hard disk. In a LAN, computers are connected by a cable through which information is sent and received. The "local" part of the term means the network is limited by geography. LANs are generally hooked up as an inter-office communications method, not to be confused with a multiuser system.

According to Kyung Yi, consulting manager for A & K Computers in San Jose, Calif., there's a difference between local area networks and multiuser computer systems. "A local area network works great if everybody in the office is doing different things—if one person is using a terminal for word processing, another for spreadsheets, another for accounting." A multiuser system, he says, is a lot more efficient if you have several terminals working on the same files at one time.

The multiuser system allows you to lock out just one record at a time, so more than one person could be work-

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and increase your ability to perform more effectively. You will see the difference between the kinds of power you exert and the importance of using your influence to affect the behavior of others. You'll also learn about three factors affecting your leadership style: the assumptions you make about people, the degree to which you are task- or people-oriented, and the attitudes you have about the competence of those you supervise.

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Blue Shield	McGraw-Hill
Bank of Boston	MCI
Bureau of the Census	U.S. Navy
Chevron USA	NCR
Ciba-Geigy	NYU
Citibank	Owens-Illinois
City of Dallas	Owens-Corning
Crown Zellerbach	Fiberglas
Dow Jones	Royal Cup Coffee
Dun & Bradstreet	Sentry Insurance
DuPont	Singapore Embassy
Ernst & Whinney	Stone & Webster
Exxon	St. Regis Paper
Federal Reserve Bank	Tampax
Fireman's Fund	The Nestle Co.
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General Foods	3M Corporation
Georgia-Pacific	TRW
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ANSWERS

ing on different records within the same file. In an inventory file, for example, several people could be updating different records simultaneously. With a local area network, Yi says, if one person is working on a file, the entire file will be "locked out" so no one else can use it until the first person is done.

Q: Can I use a mouse with my Apple IIe? If so, how can I convert my software to use the mouse?

A: According to John Morand of the Appleseed User's Group in Worcester, Mass., and a technical support representative for Apple Computer Co., it is possible to hook up a mouse to an Apple IIe or II Plus. Apple has recently released its AppleMouse II, which retails for \$149 and includes MousePaint graphics software; other packages are planned. The AppleMouse II hooks into an interface card which plugs into the computer.

To use a mouse, your Apple II Plus or IIe must run under ProDOS, which means you need a 16k expansion card to use the mouse with the II Plus. (The IIe comes with 64k.)

Instructions for converting your own software are included with the mouse. "It is not a simple matter," says Morand, "but it can be done." Morand does not recommend trying to convert software that you've purchased, only software you've written yourself.

Q: What kind of printers run with the new Macintosh?

A: At this point, according to Kathleen Dixon, corporate communications representative for Apple Computer, the company's new Macintosh can only interface with the Apple Image Writer.

The company is working on software (a print driver) to allow a user to connect a Macintosh to letter quality printers, such as the company's

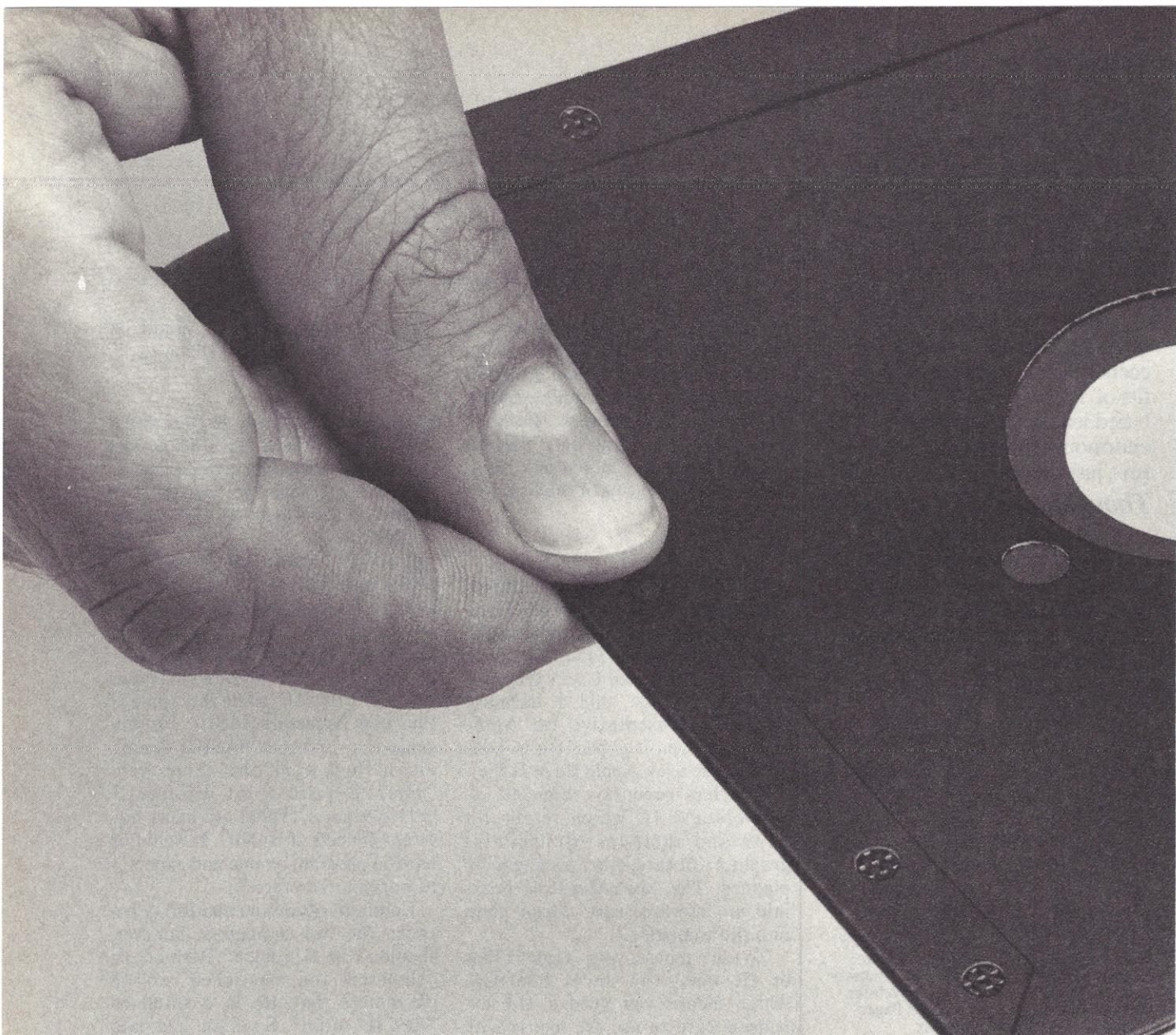
Apple Daisywheel. This should be available this summer, Dixon says.

Q: I have an Apple II Plus and a friend has a TRS-80 Model III. He has work for me to do, but we are having trouble getting the two systems to work together. How can we do this?

A: That depends on the kind of work you want to do. If you're trying to do programming, you may be out of luck. According to Rick O'Dwyer, customer support for Tandy Corp., the TRS-80 Model III uses Microsoft BASIC, while the Apple II Plus uses Applesoft BASIC. Just because they are both BASICs doesn't mean they work the same way. "They're quite a bit different," O'Dwyer says. "There are many different dialects of BASIC. It would be hard to program on one and expect it to work on the other."

Communications compatibility between the two computers, however, shouldn't be a problem. Both of the computers you mentioned rely on characters that are in a standard "ASCII" format. So if you had data you wanted to transfer from one computer to another—word processing text, for example—it should be a fairly straightforward process. You would save your data in the ASCII format, then transmit it using a telephone modem.

To do this, you'll each need a modem, of course, as well as communications software. Make sure you buy terminal programs that have the capability of uploading and downloading files. (Some software packages, won't let you save transmitted information to disk or send information that you've already saved. You don't want those.) Your communications software may be different than your friend's, but that doesn't matter, as long as your software is compatible with your Apple II Plus and his software is compatible with his TRS-80 Model III. 



This one sloppy floppy can

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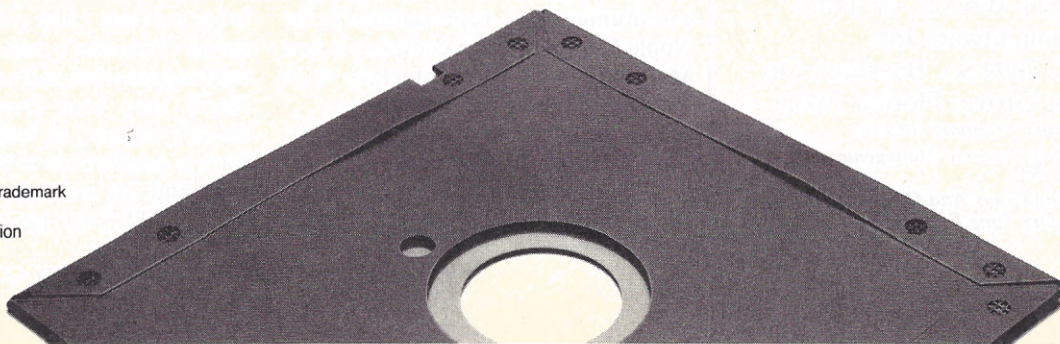
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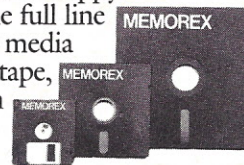
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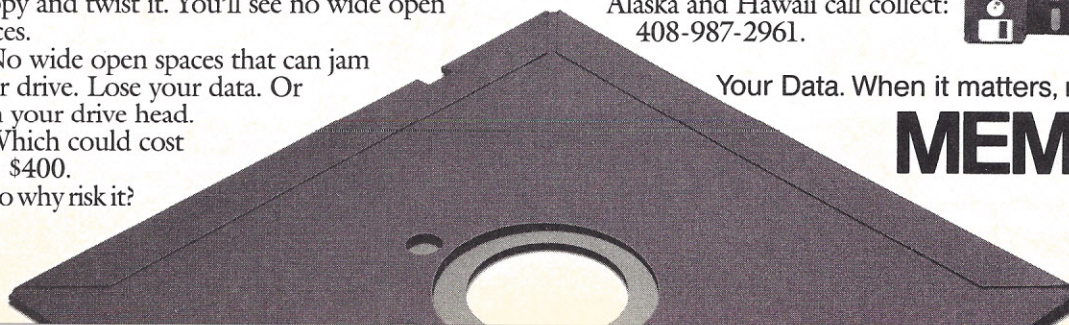
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CIRCLE 22



SYSTEMS

DEC RAINBOW 100B

Digital Equipment Corporation has released a new version of its Rainbow 100, the Rainbow 100B—which has twice the base memory and four times the expansion memory of the original Rainbow 100. This new model can be upgraded to support a Winchester hard disk.

Digital marketing manager Bill Wise says the 100B “combines the low price of a floppy disk system with the expansion capacity normally only found in hard disk systems.” The 128k base memory of the 100B can be expanded to 768k.

“With its expanded memory, our customers can run many of today’s sophisticated, popular software packages without purchasing additional memory,” claims Wise. “The system can be significantly upgraded without changing power supplies and operating systems—a major convenience and cost savings for users whose needs are growing.”

An advantage of the larger memory of the 100B is that programs such as spreadsheets can process more data and larger models at one time, so the programs can run faster.

Graphics were another area Digital sought to improve with the 100B model. The 100B offers 16 shades in monochrome and 16 displayable colors from a palette of 4096 colors. So users have more flexibility with packages that let them define colors, such as GraphWriter from Graphic Communications, Inc., and Color Magic from Brightbill-Roberts & Co., Ltd.

Included in the price of the system are CP/M-86 Version 2, and MS-DOS Version 2.05 operating systems.

Keyboard and monitor are not included in the \$2750 suggested retail for the 100B. A 12” monochrome monitor is available for \$325, and a 105-key keyboard can be purchased for \$245.

FOR MORE INFORMATION: DIGITAL EQUIPMENT CORP., 200 Baker Ave., Concord, MA 01742; (800) 344-4825.

Eagle Turbo XL

This 8086-based system has 256k of RAM expandable to 512k, 10 Mbytes of integrated hard disk storage and a floppy drive. A speed switch on the Turbo XL gives users a choice of two processing speeds: 4.77 MHz or 8 MHz.

Described by Eagle Computer, Inc. as “highly compatible with the industry’s more popular software written for the IBM Personal Computer, XT and IBM Personal Computer plug-compatible peripherals,” the Turbo XL includes the latest versions of the MS-DOS operating system and BASICA language at no extra charge.

\$4995

*Eagle Computer, Inc.
983 University Ave.
Los Gatos, CA 95030
(408) 399-4200
retail*

Romar II (X)

Designed to be Apple-compatible, the Romar II (X) uses a 6502 processor with 64k of ROM expandable to 192k and includes a Z-80 card for running CP/M programs. The keyboard has 87 keys, including function keys and numeric keypad. Built-in command software allows most keys to be preprogrammed for special functions.

The Romar II (X) accommodates two floppy drives and the chassis contains eight expansion slots.

\$695

*Romar Computer Systems, Inc.
22110 Clarendon St.
Suite 103
Woodland Hills, CA 91367
(818) 999-1083
retail or direct order*



For a retail price of \$995, the P1340 dot-matrix printer offers letter-quality, high-speed and graphics modes.

The economy model, the 80-column P1340, retails for \$995. “The P1340 is being offered at less than half the price of other printers in its family, and hundreds of dollars below comparable competitive products,” says John Rehfield, vice-president at Toshiba America’s information systems division.

“Our challenge was to achieve letter-quality resolution from an economical dot-matrix printer,” says Rehfield. “Our solution is based on our proprietary high-density printhead design that produces an overlapping dot pattern using print wire that’s about twice the diameter of a human hair.”

“In the letter-quality mode, the P1340 produces perfectly formed characters at 54 characters per second with definition previously achieved only with daisy-wheel printers but with 50 percent greater speed,” claims Rehfield.

In its draft-quality mode, the P1340 prints at 144 cps. Graphics have a density of 180 by 180 dots per inch. All three modes feature single-pass printing, which is said to boost throughput, especially with underlining, boldface, and super- and subscripts.

Additional features of the P1340 include software-selectable multiple fonts, pitches, line spacing, condensed print, and proportional spacing. Qume 5 print emulation, for use with most word processing packages, is standard. The P1340 uses a Centronics-compatible interface.

PERIPHERALS

TOSHIBA 1340 AND 1351

Toshiba America, Inc., has introduced two new dot-matrix printers, the P1340 and the P1351, that use Toshiba’s “three-in-one” technology. This technology features a 24-pin printhead for three types of output: letter-quality, high-speed drafts, and precision graphics.



Featuring downloadable fonts, and high-speed drafts, the P1351 is seen here with an optional sheet feeder.

The P1340 takes letter sheet or continuous forms from 4.5" to 10" wide. In the compressed print mode, it can produce a 132-column format on letterhead-sized sheets.

Top-of-the-line in Toshiba dot-matrix printers is the P1351, a \$2195 model with capabilities for downloadable fonts, high-speed letter quality text, and high-resolution graphics. It uses the same micro-thin print wire as the P1340, and its printhead, with a projected life of 200 million impressions, is pin-replaceable.

The fastest of Toshiba's models, the 132-column P1351 produces letter-quality copy at 100 cps, which is two and one-half times the speed of most daisy-wheel printers. It can do draft-quality copy at 192 cps. In its graphics mode, high-resolution, dot-addressable graphics are produced at a density of 180 by 180 dots per inch.

Rehfield outlines this printer's special appeal: "The P1351 is designed for users who are seeking the ultimate in 'three-in-one' printing.

"Our downloadable fonts feature offers the user greater flexibility than ever before. And a large selection of fonts will soon be available on IBM Personal Computer-compatible disks," Rehfield adds.

Like the P1340, the P1351 does single-pass printing in all three modes, and the condensed print feature allows for 226-column formats, which can accommodate large spreadsheets.

The P1351 handles cut sheets and

continuous forms from four to 15" wide, delivering one original and three copies.

Like the P1340, the P1351 has a parallel Centronics-compatible interface, but can also be equipped with a serial RS-232 interface.

FOR MORE INFORMATION: TOSHIBA AMERICA, INC., 2441 Michelle Dr., Tustin, CA 92680; (714) 730-5000.

B.I.-80 Column Adaptor

A plug-in module for the Commodore 64, the B.I.-80 provides an 80-column display, and can be switched from 80 columns to 40 columns. It can be used with Commodore color monitors 1701 and 1702, or with any monochrome video monitor.

For Commodore 64

\$199.95

Batteries Included

3303 Harbor Blvd.

Suite C9

Costa Mesa, CA 92626

(714) 979-0920

retail

BusCard II

BusCard II lets you use the Commodore 64 with any Commodore-compatible disk, including hard disk, and with virtually any printer, according to the company. BusCard II is both hardware and software invisible and compatible with other software.

For Commodore 64

\$199.95

Batteries Included

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Costa Mesa, CA 92626

(714) 979-0920

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ESI-2002 ShareSpool

ESI-2004 ShareSpool

A ShareSpool board lets three personal computers share one printer. The board acts as an intelligent printer interface, automatically spooling and managing print output for 1, 2 or 3 systems. Each board requires one option slot in one HP-150.

The ESI-2002 lets users share a serial (RS-232-C) printer, while providing 64k of spooler memory



ULTRATERM?

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With the wide variety of peripherals available, it's difficult to evaluate the quality of accessories for your Apple. Listen to what the professionals say about UltraTerm.

BYTE—FEB. '84

"Overall, the UltraTerm display card is one of the best peripheral devices I have seen to enhance the display capabilities of the Apple."—P. Callamaras

SOFTALK—SEPT. '83

"The UltraTerm shines brightest in use with spreadsheets and word processors."

COMPUTER RETAILING—FEB. '84

"The UltraTerm is a high quality investment for anyone who has an Apple product and wants to add to it."

PEELINGS II—VOL. 4. NO. 8 '83

"The UltraTerm will be the new industry standard for Apple video display cards. The availability of the extra modes will enhance almost any software product that uses the text screen."

PERSONAL COMPUTING—MAY '83

"Perhaps the most impressive achievement of the UltraTerm expansion board is that the character set it produces is so sharp that its difficult to see the dots that make up each character."

The experts agree—the UltraTerm is one of the best display devices for Apple computers.

Videx Inc.

1105 NE Circle Blvd.
Corvallis, OR 97330
(503) 758-0521

PRODUCTS

standard, with up to 128k optional.

The ESI-2004 lets users share a parallel (Centronics-compatible) printer; it accepts input from an RS-232-C-equipped system and converts the output to parallel form. For HP-150

\$485 (either model)
Extended Systems, Inc.
P.O. Box 4937
Boise, ID 83711
(208) 322-7163
 direct order

EXP 400

Diablo 630-compatible, the EXP 400 daisy-wheel printer can do underlining, boldface, superscript and subscript. Standard character spacing is 10-, 12- and 15-pitch are software selectable. The EXP 400 prints at 12 cps.

\$399
Silver-Reed America, Inc.
19600 S. Vermont Ave.
Torrance, CA 90502
(213) 516-7008
 retail

jrCaptain

Available in 64k increments from '0' to 128k, the jrCaptain multifunction board features an IBM-compatible printer port and clock/calendar with battery backup.

For IBM PCjr
\$235
Tecmar, Inc.
6225 Cochran Rd.
Solon, OH 44139-3377
(216) 349-0600
 retail

Legend 800

An 80-column printer, the Legend 800 dot-matrix model prints at 80 cps and features a replaceable printhead with a lifetime, according to the company, to be better than 30 million characters.

\$350
CAL-ABCO
14722 Oxnard St.
Van Nuys, CA 91401
(818) 994-0909
 retail or direct order

Mark X

The newest addition to the Signalman

line of modems, Mark X is a smart, 300-baud auto-dial, auto-answer modem.

According to Anchor Automation, Mark X operates on most popular software communications packages and can work manually through a keyboard, without computer coding; or automatically, to answer and originate calls at 300 bps for Bell 103-compatibility.

Equipped with a standard RS-232 serial interface with built-in cable, Mark X also comes with two telephone jacks, a cord, a 12-volt power supply and connects directly to the wall telephone outlet.

\$169
Anchor Automation
6913 Valjean Ave.
Van Nuys, CA 91406
(818) 997-6493
 retail

MPP-1000C Modem

Providing auto-answer/auto-dial capability and a direct connection to the phone line, the MPP-1000C connects to the joystick port. It includes smart terminal software.

For Atari 400, 800
\$149.95
Microbits Peripheral Products
225 W. 3rd St.
Albany, OR 97321
(503) 967-9075
 retail

ParallAx-AT

An expansion interface that connects any standard parallel-input printer to an Atari computer, the ParallAx-AT functions like the Atari 850 Interface Module, but without the serial ports.

For Atari 400, 800, 1200XL
\$99
Axiom Corp.
1014 Griswold Ave.
San Fernando, CA 91340
(818) 365-9521
 retail

T-Retriever

A dual-function interface card, T-Retriever allows access to protected data and electronically switches between two printers.

For Apple II, II Plus, IIe
\$169

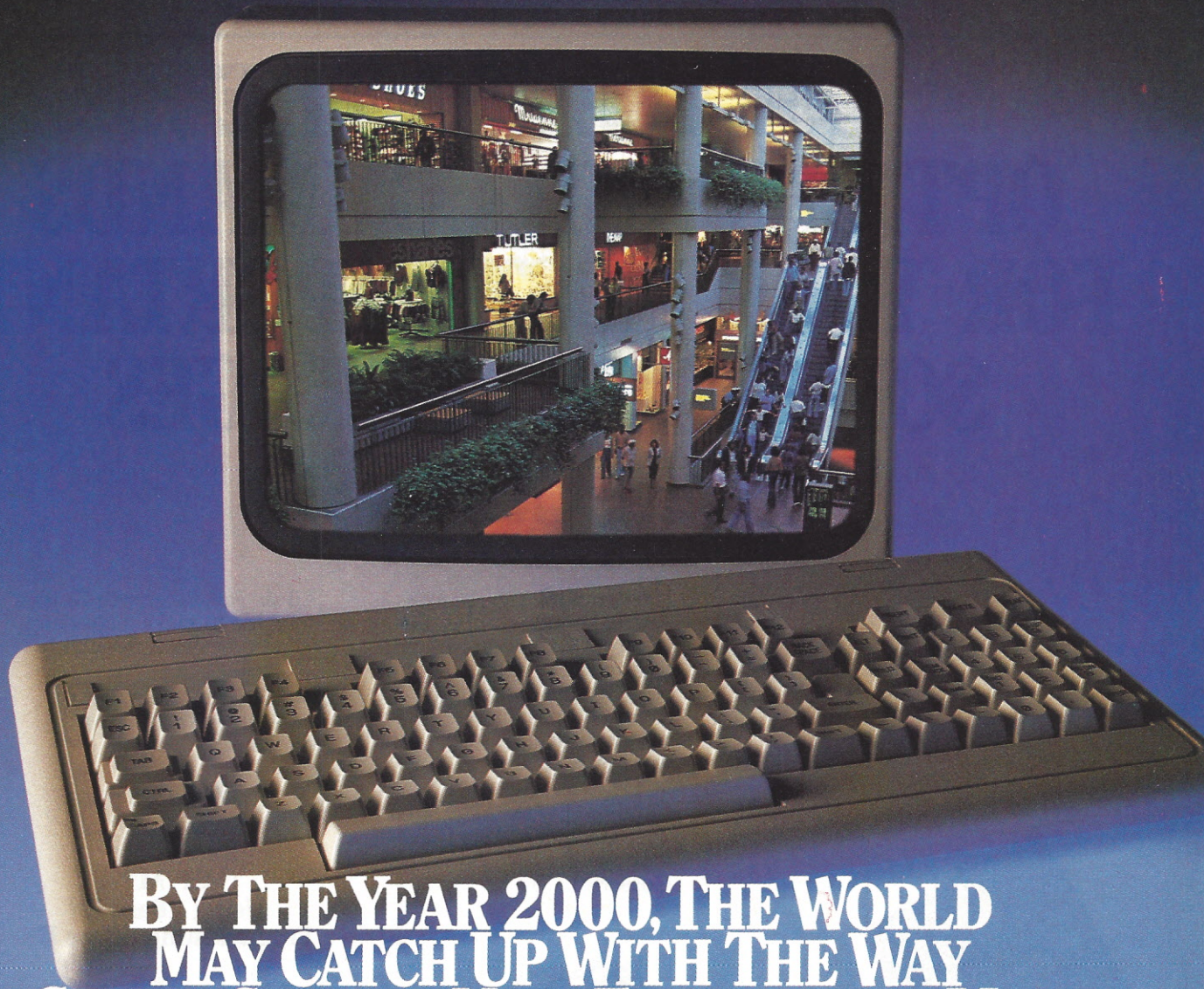
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 Immac
 Innovative Software
 Knapp Press
 Magazine Entree
 Magazine Supply House
 Manufacturer's Hanover Trust
 Max Ule
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 Pan American Electronics
 Peachtree Software
 Practical Peripherals
 Program Store
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 Sears
 Select Information Exchange
 Sim Computer Products
 Simon and Schuster
 Small Computer Book Club
 Software Advisor
 Stark Brothers
 Supersoft
 Vanguard
 VisiCorp
 Waldenbooks
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 Ziff-Davis

Merchants and manufacturers who want to participate in the Electronic Mall™ may contact: Stephen A. Swanson, L.M. Berry & Co., P.O. Box 6000, Dayton, OH 45401, (513) 296-2015.



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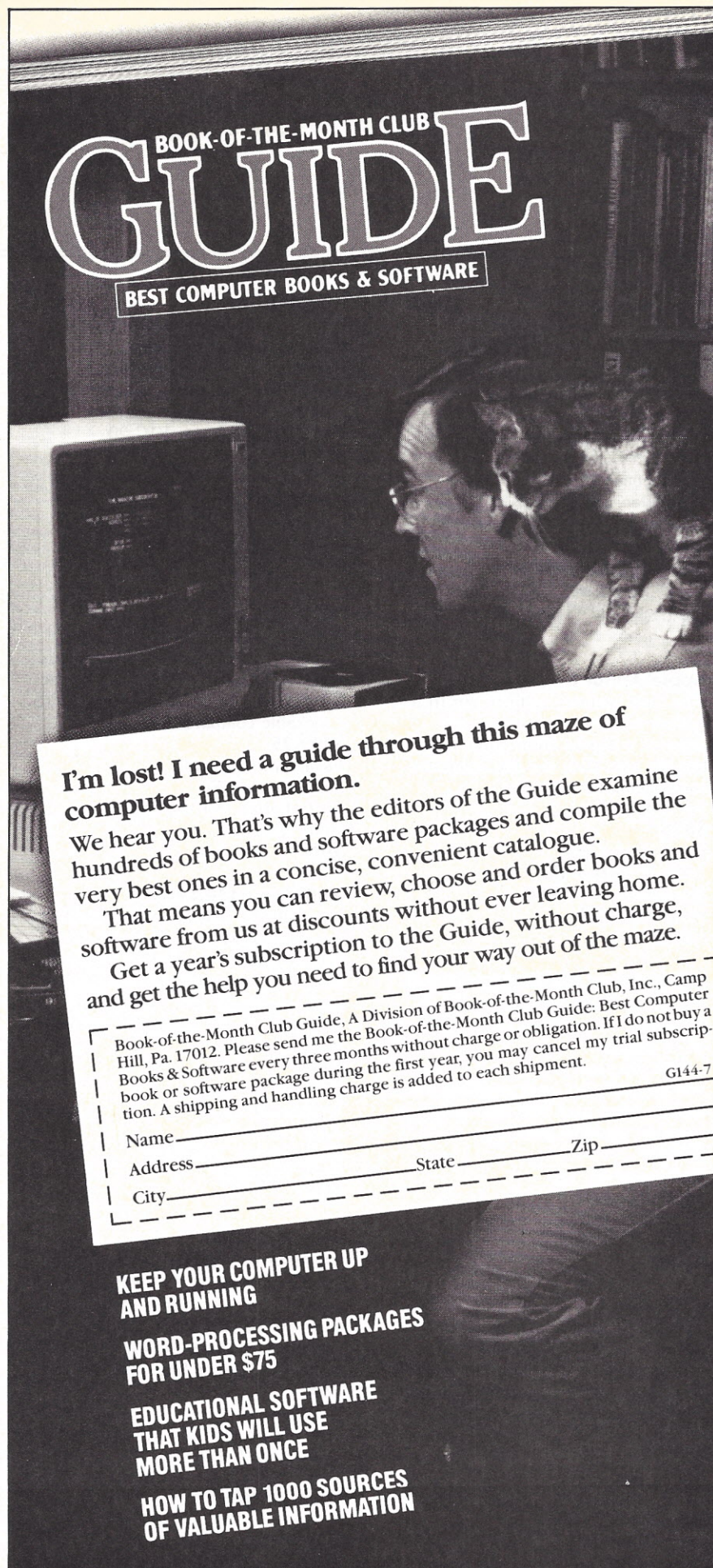
BITS & PIECES

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At the May Comdex show in Atlanta, ComputeRise, Inc. introduced two new computer stands.

One of them is made of acrylic, and it measures 21" by 16 $\frac{3}{8}$ " by 5 $\frac{1}{4}$ ", a size suitable for portables such as the Compaq. Designed to raise the monitor and disk drives to a comfortable viewing height, this acrylic stand retails for \$69.95.

The other stand introduced at Comdex was a 20-gauge stand with a sliding plastic keyboard drawer. The drawer extends from underneath the platform to a locked position to



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BUSINESS

CORRECTSTAR

MicroPro International and Houghton Mifflin Company have collaborated to produce CorrectStar, a spelling checker for MicroPro's popular word processing package WordStar. CorrectStar is designed to find misspellings and typographical errors in WordStar documents and promptly suggest a correct alternate word.

CorrectStar's accuracy, says MicroPro, results from the design and research work of Houghton Mifflin, a leading publisher and lexical authority. The program incorporates a lexical algorithm and a data base taken from Houghton's *American Heritage Dictionary* to find and correct misspellings or typos. The 65,000-word CorrectStar data base consists of 99 percent of the most frequently used words in the English language as determined by frequency studies performed by Houghton Mifflin.

The CorrectStar program can be entered directly from WordStar. When it spots a word which is misspelled or unfamiliar to its data base, an alternate word is suggested. Once a suggestion is made, you can correct the word as suggested, correct the word globally, show the next suggestion, show the previous suggestion, enter the correction from the keyboard, bypass the word this time, bypass it throughout the document, or simply return to WordStar.

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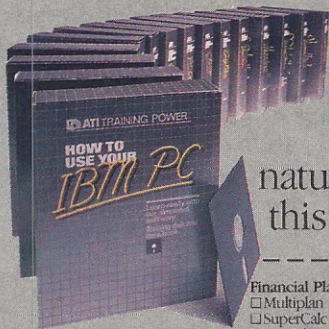
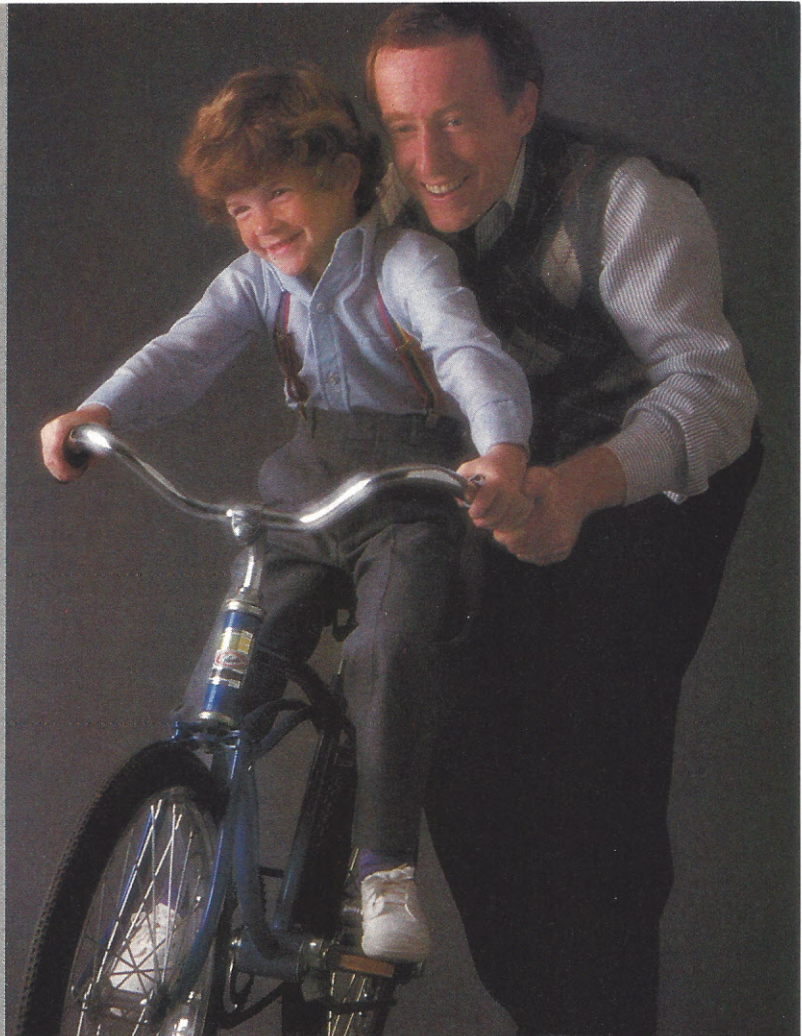
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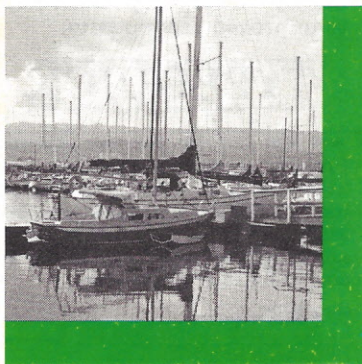
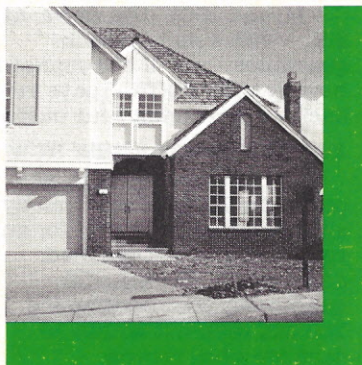
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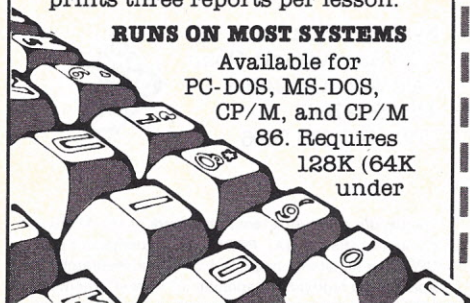
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CIRCLE 175

PRODUCTS

Colorado Computer Classics
800 Hayden
Longmont, CO 80501
(800) 835-2446
direct order

SS, Spread Sheet

A low-cost spreadsheet, this program has a variety of applications such as: cash flow, expenses, sales projection and stock portfolios.

For IBM Personal Computer, XT, PCjr

\$59

Micro Architext, Inc.
6 Great Pine Ave.
Burlington, MA 01803
(617) 273-5658
direct order

StarMate

StarMate can gather productivity information on 20 machines that perform repetitive manufacturing.

For IBM Personal Computer, XT

\$20,000

PlantStar, Inc.
725 Concord Ave.
Cambridge, MA 02138
(617) 661-1950
direct order

Status

A statistical package for the Apple, Status computes general means and moments, test statistics, one-way, two-way Anova and analysis of covariance.

For Apple II series

\$295

Software Specialties, Inc.
Box 329
Springboro, OH 45066
(513) 748-0471
direct order

Teacher's Record Book

A teacher's utility, Teacher's Record Book computes grades by averages, weighted averages or total points.

For Apple II series

\$60

Successful Software
2232 Crosswind Dr.
Kalamazoo, MI 49008
(616) 381-1691
retail or direct order

The Benchmark

Under the umbrella of The

Benchmark series, Metasoft has introduced five new packages: the Administrator, the Financial Planner, the Data Manager, Business Graphics and Presentation Graphics. Each program in the series is a fully functioning, stand-alone package that communicates with each other to provide up-to-the-minute business information in a variety of applications.

For MS-DOS-based systems

\$195 to \$295

Metasoft Corp.
6509 W. Frye Rd.
Suite 12
Chandler, AZ 85224
(800) 621-1908
retail or direct order

The Graphix Idea

A new system of three software programs called The Grafix Idea allows business users to use their IBM-compatible personal computers as a replacement for an overhead projector or 35mm slide projector when giving a visually-aided business presentation.

For IBM Personal Computer, PCjr

\$79.95

Idea Ware, Inc.
225 Lafayette St.
Suite 712
New York, NY 10012
(800) 221-7798
(212) 334-8043 in New York State
retail or direct order

The Idea Manager

Idea Manager is a personalized main menu which a user builds to include his own favorite software packages. Once established, the user chooses the desired software from the list displayed on-screen.

For IBM Personal Computer

\$49.95

Idea Ware, Inc.
225 Lafayette St.
Suite 712
New York, NY 10012
(800) 221-7798
(212) 334-8043 in New York State
retail or direct order

The King Of Wall Street

The King of Wall Street, which comes with a data base, depicts stock market trend indicators and overbought/

oversold indicators.

For Apple II series

\$450

Erlanger Software
P.O. Box 31169
Hartford, CT 06103
(203) 721-7340
retail or direct order

Unify

Aimed at small business users and systems integrators, Unify is a relational data base manager program that features rapid access and multiuser capabilities.

For TRS-80 Model 16B

\$750

Tandy Corp./Radio Shack
1800 One Tandy Center
Fort Worth, TX 76102
(817) 390-3300
retail

Wordease

Wordease is a full-function word processor that can be used separately or with Dataease. Documents are formatted on-screen, paragraphs can be set up in multiple side-by-side columns, copy can be protected from page breaks and information mistakenly deleted can be restored.

For DEC Rainbow; IBM Personal Computer; TI Professional; Wang Professional

\$300

Software Solutions, Inc.
305 Bic Dr.
Milford, CT 06460
(800) 421-2916
(203) 877-9268 in Connecticut
retail

Xeno-Disk

Xeno-Disk will read, write, format and duplicate nearly 60 different types of 5¼" double-density disk formats without additional hardware.

For IBM Personal Computer, XT

\$379.50

Vertex Systems
7950 W. Fourth St.
Los Angeles, CA 90048
(213) 938-0857
direct order

XT-Driver

A menu driven and security system, XT-Driver assigns the user a password and a security code. This information

builds the user's menu and provides access to applications according to the user's security code level.

For IBM Personal Computer, XT
\$80

Chas-Moore, Inc.
3104 Jackie Ct.
Bakersfield, CA 93309
(805) 834-8808
retail or direct order

EDUCATION

BASIC JR

Courseware, Inc., has introduced BASIC Jr, a tutorial package designed to teach the fundamentals of BASIC language programming to ages 10 and up. Running on the IBM Personal Computer or PCjr, BASIC Jr uses a colorful format to instruct on programming concepts such as how to load, list, and write simple BASIC programs.

BASIC Jr also includes a graphics instruction and utility called Graphics Jr on the same disk. In addition to teaching graphics programming techniques, Graphics Jr lets you draw and paint lines and shapes, change their shape and color, and rotate the shapes to create more complex drawings.

The programming tutorial provides instruction on some advanced BASIC commands as well, demonstrating in step-by-step fashion how an included game—called Runtime—was designed. Some of these advanced topics include program structure, dimensional arrays, random number generators, and animated graphics.

"BASIC Jr motivates the user to learn at a more accelerated pace," says Bill Hughes, Courseware's vice-president of marketing. "The package also allows users to select both the learning sequence and the pace, making the learning experience both enjoyable and educational."

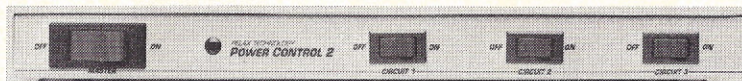
BASIC Jr retails for \$49.95 and requires a color graphics card for use with the IBM Personal Computer.

FOR MORE INFORMATION:

COURSEWARE, INC., 10075 Carroll Canyon Rd., San Diego, CA 92131;
(619) 578-1700.

The Controller

Controls Power, Peripherals, Spikes, and Glitches.



Power Control™ protects computer circuitry and data stored in memory against the damage voltage spikes can cause.

Puts on/off control of your computer, terminal, printer, and more at your fingertips in a slim panel unit sized to fit *underneath* your computer terminal.

Contains a master switch (to turn your computer, terminal, printer, a modem or a lamp on or off at the same time) and three additional switches to turn peripherals on or off in any order you desire.

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air conditioners • power tools
furnaces • electrostatic copy machines • computer disc drives • appliances • hairdryers

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Undervoltages in power lines (Occur as surge following blackouts and brownouts.)

Lightning strikes (Direct hits and strikes several miles away.)

Overloads, short circuits or grounding of circuit.

Power Control 2 also protects against noise interference (unwanted electrical signals) picked up and transmitted by power lines, power supply cords, and noise generated by static electricity.

Sources of noise interference are: Fluorescent lights • Wiring receptacles, plugs, sockets • Radio transmission • Television transmission • Sunspot activity • Operating computers, machines • Automotive ignition systems • and the same causes of electrical spikes listed at left.

Relax Technology.

To order, phone: 415/471-6112 or mail to: 3101 Whipple Rd., #25, Union City, CA 94587
Prices include shipping.

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*Calif. Residents add applicable sales tax.

☐ Power Control 2

\$89.95*

FEATURES: 10 amp circuit breaker. RFI noise filtering. IEC power connector

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Address _____

City _____ St. _____ Zip _____

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Eliminates reaching over, behind and around devices to turn them on or off.

Puts control of computer at your fingertips.

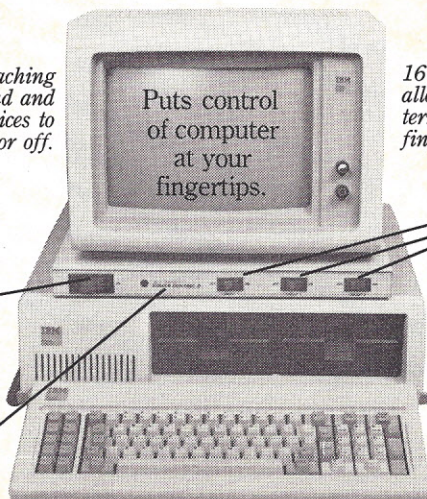
16" width, 11" depth allows placement under terminal for fingertip control.

Master switch turns computer and all peripherals on or off at same time.

Additional switches give individual control over peripherals.

Less than 2" high.

Organizes power wires. 4 cords in- 1 cord out.



© Relax Technology. The company that works so you can relax and get down to business.

CIRCLE 167

PRODUCTS

Animated Arithmetic

Designed for young children and students in remedial classes, Animated Arithmetic teaches addition without the need for reading. For Apple II series; Commodore VIC 20

\$10.95

PMI, Inc.
High St.
P.O. Box 87
Buckfield, ME 04220
(800) 227-1836
direct order

Basics of BASIC

Basics of BASIC teaches the fundamentals of the BASIC programming language. For Apple II Series; IBM Personal Computer

\$99

Focus Media, Inc.
839 Stewart Ave.
Garden City, NY 11530
(516) 794-8900
retail

Countries, States and Capitals

Aimed at students in grades 6 through 12, Countries, States and Capitals has three modes of operation and three levels of difficulty.

For TRS-80 Models I, III, 4

\$22.50

DeZoysa Enterprises
P.O. Box 170
Keyport, NJ 07735
(201) 739-1981
direct order

Discovery Reading Works

A series of four programs, Discovery Reading Works includes The

Alphabet Factory, Match-Up, The Word Bird and Time Zone. For Atari 400, 800; Commodore 64

\$29.95

Gladstone Electronics, Inc.
1585 Kenmore Ave.
Buffalo, NY 14217
(716) 874-5510
direct order

Early Words Series

The Early Words Series consists of two primary-level programs: Early Words English/Spanish, and Early Words II.

For Apple II series

\$29.95

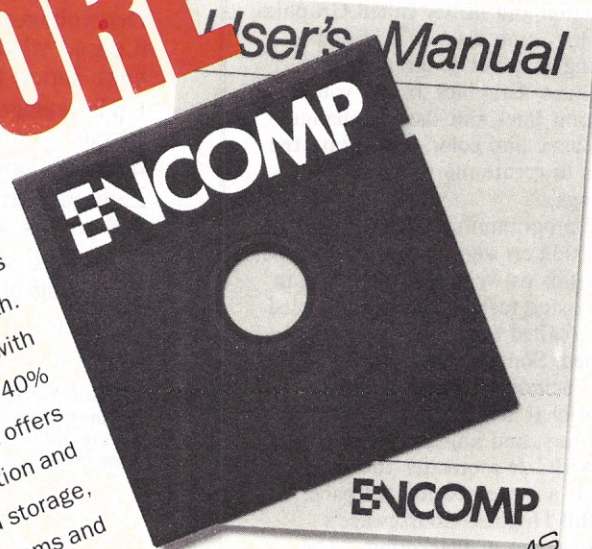
Merry Bee Communications
815 Crest Dr.
Papillion, NE 68046
(402) 592-3479
direct order

Encomp. The utility program for data and program files that delivers more for less.

LESS IS MORE

Disk file systems have two major problems: limited on-line capacity and no security. **Encomp** is designed to address both.

This PC DOS/MSDOS-compatible program functions with any combination of disk drives and features an average 40% compression rate. At \$75.00, no competitive product offers so much for so little. **Encomp**, with its encryption and compression capabilities, offers increased storage, controlled access on multi-user systems and a virtually unbreakable algorithm.



elite SOFTWARE SYSTEMS

For further information,
write P.O. Box 232, Saratoga, CA 95071
or call (408) 988-6960

Eco-Paradise

Eco-Paradise is a two-program set that uses a quiz-game approach to teaching ecology/environmental material.

For Apple II series; CP/M-based systems; MS-DOS systems; IBM Personal Computer

\$39.95

Center for Science in the
Public Interest
1755 S. Street N.W.
Washington, D.C. 20009
(202) 332-9110
direct order

Factoring Whole Numbers

Factoring Whole Numbers is a set of 12 interactive programs that present the concepts of factoring to middle school or upper elementary school students.

For Commodore 64

\$90

Quality Educational Designs
P.O. Box 12486
Portland, OR 97212
(503) 287-8137
direct order

Fantasy Land

A reading comprehension game, players sail forth on an adventure through a fantasy land in quest of the fabled sword of justice.

For Apple II series

\$49.95

Learning Well
200 S. Service Rd.
Roslyn Heights, NY 11577
(800) 645-6564
retail or direct order

Galaxy Search

Designed to better reading comprehension and critical thinking, Galaxy Search has you traveling throughout the galaxy in search of stolen parts.

For Apple II series

\$49.95

Learning Well
200 S. Service Rd.
Roslyn Heights, NY 11577
(800) 645-6564
retail or direct order

Magic Castle

A vocabulary skills game, Magic Castle transforms one to six players



The more you study other accounting systems, the more you'll understand why you should buy mine.

I'm Irwin Taranto, and I built my reputation with these accounting programs. I've refined them and upgraded them to the point where they're about two years ahead of the marketplace.

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Integration: These are no ordinary stand-alone accounting systems. They not only integrate with each other, they integrate with your other software—right between your database and your spreadsheet, tied into your word processing, transferring and posting information automatically.

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Speed: Most systems can't move information from general ledger to spreadsheet at all. Mine can do it in seconds. My system won't take 45 minutes to do a financial statement. It can do it as fast as your printer can print.

Convenience: I could cover this whole two pages with a list of convenience features. Some are so subtle you wouldn't understand why I put them in until you'd worked with the system for six months. I'm not just a software designer, I used to earn my living as an accountant. I know which features really help and which don't.

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CIRCLE 157

Business as Usual?

Business as usual these days means a computer that's up and "humming." But if your computer were stolen or damaged, you wouldn't have business as usual.

YOU'D HAVE TROUBLE!

You can get fast replacement for your entire system and be back in business in a hurry by protecting your computer with SAFEWARE Personal Computer Insurance. It's the only coverage designed specifically for personal computers used for business—in your office, shop or home.

SAFEWARE protects ALL hardware, ALL purchased software and ALL media against theft, damage or any other kind of loss, regardless of use, after a low \$50 deductible.

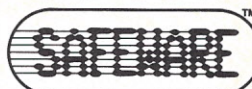
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your computer
it wouldn't be.)*

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PRODUCTS

into old wizards who must define vocabulary words to ascend a castle. For Apple II series

\$49.95

Learning Well
200 S. Service Rd.
Roslyn Heights, NY 11577
(800) 645-6564
retail or direct order

Magic Music 1, 2, 3

A musical education program for ages 8 and up, Magic Music 1, 2, 3 teaches children musical notes and symbols. For Commodore 64

\$29.95

HesWare
150 N. Hill Rd.
Brisbane, CA 94005
(415) 468-4111
retail or direct order

Medalists Series

The six programs in the Medalists Series cover a variety of topics designed to aid social studies students and teachers.

For Apple II series

\$39.95 each

Hartley Courseware, Inc.
P.O. Box 431
Dimondale, MI 48821
(616) 942-8987
retail or direct order

Playful Professor

Playful Professor uses a magic castle and a ghost to help teach addition, subtraction, multiplication and division.

For all Atari; Commodore 64

\$29.95

Screenplay
P.O. Box 3558
Chapel Hill, NC 27514
(919) 493-8596
retail or direct order

Poster

Poster is designed to teach young children how to create colorful computer graphics while learning the concepts of programming.

For Commodore 64

\$19.95

Scholastic, Inc.
730 Broadway
New York, NY 10003
(212) 505-3567
retail

Secret Filer

An electronic filing system for children, Secret Filer lets you sort, save and edit files.

For Commodore 64

\$19.95

Scholastic, Inc.
730 Broadway
New York, NY 10003
(212) 505-3567
retail

HOME

CONTINENTAL JR SERIES

Arrays, Inc./Continental Software has expanded their line of home and small business software to include packages for the IBM PCjr. The first five programs released by Continental are The Home Accountant jr, The Tax Advantage jr, The Home Cataloger jr, F.C.M. jr, and UltraFile jr.

The Home Accountant jr, a version of the popular home finance package The Home Accountant, tracks up to five checkbooks, all cash and credit card transactions, and up to 100 budget categories. The program also prints checks and a variety of financial reports.

The Tax Advantage jr, modeled after the original Tax Advantage program, supports Forms 1040 and 4562, and schedules A, B, C, D, E, G, SE, and W. The program lets you itemize any line, call up longer descriptions of the lines on the 1040 form, and calculate taxes at any time.

The Home Cataloger jr is a cataloging and personal inventory program. The program can do column totaling on numeric fields and has 10 predefined filing systems.

F.C.M. jr, a mailing list program, can print single or continuous-feed labels, envelopes, and specialized or master lists.

UltraFile jr is a file management system that offers formatted data entry, calculations, standard or custom reports, and file transfer capabilities. UltraFile jr retails for \$99.95, F.C.M. jr for \$74.95, The Home Cataloger jr for \$49.95, The Tax Advantage jr for \$69.95, and

The Home Accountant jr for \$74.95.

FOR MORE INFORMATION: ARRAYS, INC./CONTINENTAL SOFTWARE, 11223 S. Hindry Ave., Los Angeles, CA 90045; (213) 417-8031.

Briefcase Games

Briefcase Games features five packages for the Model 100: Casino Games, Fun 'N Games I, Fun 'N Games II, Board Games and Graphic Games.

For TRS-80 Model 100

\$29.95

Micro Software Systems
444 N. Grove Dr.
Alpine, UT 84003
(801) 756-4621
direct order

Bruce Lee

You, as the Bruce Lee character, must summon all of your martial arts prowess to get to the Evil Wizard. For Apple II series; Commodore 64; IBM Personal Computer, PCjr

\$34.95

Datasoft
19808 Nordhoff Pl.
Chatsworth, CA 91311
(818) 701-5161
retail

Coins

Coins is designed to let you determine the current market value of your coin collection by evaluating 1600 common U.S. coins.

For Apple II series; IBM Personal Computer, XT, PCjr; TRS-80 Models I, III

\$95

Compu-Quote
6914 Berquist Ave.
Canoga Park, CA 91307
(818) 348-3662
direct order

DragonHawk

An adventure and strategy game, DraganHawk pits you against a flying serpent.

For Commodore 64

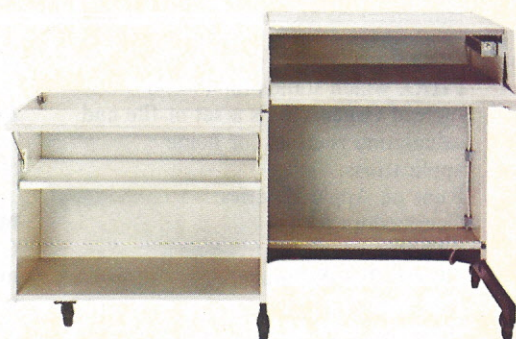
\$29.95

Creative Software
230 E. Caribbean Dr.
Sunnyvale, CA 94089
(408) 745-1655
retail

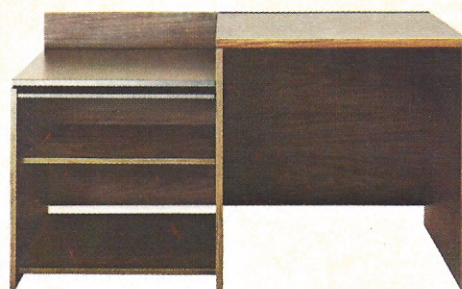
One good idea



deserves another



and another



and

another.



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You'll find our IBM PC Furniture in a variety of attractive colors at your IBM Product Center. The IBM PC Work Station is also available at participating retailers. To find out the location nearest you or to order by phone, call *IBM Direct* toll free at 1 800 IBM-2468, ext. 91.

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CIRCLE 82

IBM®

PRODUCTS

FIDO

FIDO, which stands for Friend InDeed Organizer, is a set of file and calculation routines for home applications.

Runs on Apple II series;
Commodore 64

\$39.95

Cherry Pick Software
P.O. Box 712
Wayzata, MN 55391
(612) 476-1458
direct order

Letterwriter

Letterwriter is designed to specifically handle the task of writing letters without the complexities of more powerful word processors.

Runs on Apple II Plus, IIe

\$45

Innova Systems
201 Hanna Rd.
River Vale, NJ 07675
(201) 573-4679
retail or direct order

Lost World Pinball

Lost World Pinball features two cavemen, Og and Grog, taking turns shoving boulders at a herd of pinosauruses in this game.

For TRS-80 Micro Color Computer Model MC-10

\$9.95

Tandy Corp./Radio Shack
1800 One Tandy Center
Fort Worth, TX 76102
retail

Math Design

Math Design contains two cassette programs, MiniCalc and Spirals, which can function as a simple calculator and design geometric designs.

For TRS-80 Micro Color Computer Model MC-10

\$9.95

Tandy Corp./Radio Shack
1800 One Tandy Center
Fort Worth, TX 76102
retail

Minnesota Fats' Pool Challenge

An electronic pool game, Minnesota Fats' Pool Challenge includes six play options for one or two players.

For Commodore 64

\$29.95

Hesware

150 N. Hill Dr.
Brisbane, CA 94005
(415) 468-4111
retail or direct order

Music Box

Combining adventure and classical music themes, Music Box challenges you to rid the universe of evil.

For Commodore 64

\$29.95

HesWare
150 N. Hill Dr.
Brisbane, CA 94005
(415) 468-4111
retail or direct order

Nutriplan

A nutrition analysis program, Nutriplan examines the nutritional value of the meals you key in.

For Apple II, II Plus; IBM Personal Computer, PCjr

\$75

Micromedex Corp.
187 Gardiners Ave.
Levittown, NY 11756
(516) 735-8979
direct order

Space Taxi

An arcade game with 25 screens, Space Taxi puts you behind the wheel of a galactic cab, picking up passengers.

For Commodore 64

\$29.95

Muse Software
347 N. Charles St.
Baltimore, MD 21201
(301) 659-7212
retail or direct order

Speed Handicapper

Aimed at providing computer-assisted horse race handicapping, Speed Handicapper can be used for both thoroughbred and quarter horse races.

For Apple II series; Commodore 64, VIC 20

\$29.95

High Desert Publishing Co.
P.O. Box 36556
Albuquerque, NM 87176
(505) 881-9131
direct order

SuperSprite Software

Written to work with the SuperSprite graphics board, the eight programs

include LogoSprite, AlphaSprite, SpriteArt, SpriteMusic and BaseballSprites.

For Apple II series

\$39.95 each

Synetix Inc.
10635 N.E. 38th Pl.
Kirkland, WA 98033
(206) 828-4884
retail or direct order

Super Zaxxon

An enhanced version of the original game, Super Zaxxon features new play elements designed to challenge the action game fanatic.

For Commodore 64

\$34.95

HesWare
150 N. Hill Dr.
Brisbane, CA 94005
(415) 468-4111
retail or direct order

The Heist

The Heist is an adventure game that centers on dashing super spy Graham Crackers who uncovers a terrorist plot for world destruction.

For Apple II series

\$40

Micro Lab Computer Products
2699 Skokie Valley Rd.
Highland Park, IL 60035
retail or direct order

Time Tunnels

It's the year 2089 and your mission is to pilot a specially equipped starship and seal the tunnels while avoiding deadly opponents.

For Apple II Plus, IIe

\$29.95

Reston Publishing Co., Inc.
11480 Sunset Hills Rd.
Reston, VA 22090
(800) 336-0338
retail or direct order

Trivia Buff

A sequel to Terminal Trivia, Trivia Buff is an adult party game which features 1000 questions.

For Apple II Plus, IIe

\$39.95

Humans, Inc.
P.O. Box 82
Evington, VA 24550
(800) 368-3238
direct order

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Power Spreadsheets

Diligent study is a key first step toward
spreadsheets heights where problem-solving
skill is second nature

by Charles Rubin, Associate Editor

There is a fundamental contradiction in the way we think of spreadsheets—and the way they actually work. We like to think that spreadsheets are a solution—like some data-crunching pill—that we can learn and then quickly apply to complex problems. In fact, spreadsheets are a *means* to a solution and learning them is much more a journey than a quick fix. The proof of this is in the range of spreadsheet users, from those who use the built-in row/column structure for simple formatting of typed in numbers, to those who build innovative and complex models.

Any program is only as helpful as you make it. Thus, better spreadsheeting probably requires a change in attitude and the level of commitment instead of a change in software. Spreadsheeting is like a trade or any other skill—easy to learn and difficult to master. Some people learn the rudiments of a program to perform simple tasks and never progress beyond that stage, while others have complex needs that demand a thorough understanding of the software. Most spreadsheet users, however, fall in the middle. Most of us find that using a spreadsheet can often be frustrating. We sense that better ways to perform daily operations exist, but never have time to learn them.

For those of us in this spreadsheeting purgatory, there's good news and

bad news. The good news is that we, too, can come to know spreadsheets well enough to implement our spreadsheeting visions. The bad news is that it won't happen overnight. Nevertheless, we can, like apprentices to the spreadsheeting trade, take a few lessons from journeyman users along the way to mastery.

Overselling simplicity

Practically all spreadsheet users have a similar initial experience: Anticipating instant analytical power and not getting it, we begrudge the program's complexity almost from the beginning. Expecting an easy-to-learn product, we boot the disk first and pick at the documentation only as a last resort. Once we've struggled through one spreadsheet, the next is likely to be limited not so much by the product's capabilities as by our limited knowledge and experience. This "arrested spreadsheet development" is quite common.

In some cases, users learned to get around the program well enough to perform a limited application. But superficial spreadsheeting almost always comes from an unstructured learning process that may later come back to haunt the user. Most journeyman spreadsheet users point to a more diligent learning approach.

John Klingel is a circulation consultant for several magazines. He's been using VisiCalc (and recently

Lotus 1-2-3) since 1981. "I had a spreadsheet in mind when I began learning," he says. "I sat down with the VisiCalc manual and started thinking about how to do it on the computer."

The spreadsheet he had in mind was a large print order projection model, requiring about 120k of memory on an Apple III. Klingel would normally use a mainframe computer model to do that kind of analysis, but one of his customers insisted that it should be possible to do it with VisiCalc. "When I started reading the VisiCalc manual, I was trying to prove to him that our model couldn't be done with VisiCalc," Klingel says. "Of course, as I read the manual I realized we could do it, and I got turned on about that. I had assumed that most of my applications were too involved to do with VisiCalc, but I've since discovered there's virtually nothing I can think of that I can't do with a spreadsheet, up to creating an incredibly complex model that occupies four disks."

Klingel's ability to use a spreadsheet to its fullest potential comes from precise study. "The manual gave me a good overview of the program," he says. "Then I designed the worksheet and set it up, referring to the manual as I went along." Of course, since he was already more familiar with the manual than most spreadsheet users ever get to be,

*Using a spreadsheet can be frustrating.
We sense better ways to perform operations
exist, but never have time to learn them.*



Illustration by James Nazz



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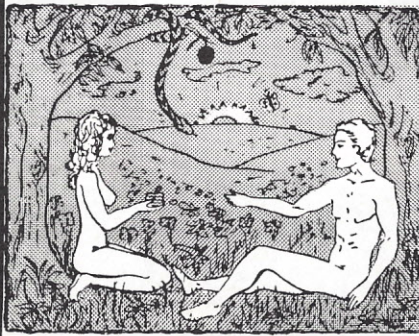
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Klingel knew pretty much which section to look in when he needed information.

"When I was done with the spreadsheet," he says, "I read the manual again, cover-to-cover, and then read it a third time." Each time he read the manual, Klingel discovered something new.

"You've got to be committed to spending 20 to 30 hours of initial work," he says. "That may seem like a painfully long time, but it's well worth it in the long run, because it saves time spent referring to the manual for basic operations."

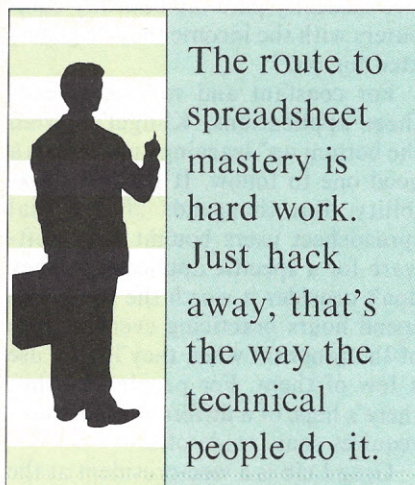
In addition to biting the bullet and actually reading the manual, Klingel has a couple of other suggestions that will help beginning spreadsheeters. "It's easier to start out with a simpler program, or simpler version of a program, and then graduate upward. I think the original VisiCalc manual is one of the best I've read." Klingel now uses the VisiCalc Advanced Version on his Apple III. While he admits his learning of 1-2-3 was less structured than it was with VisiCalc, Klingel has not forsaken manual reading. "I have a tendency to take the 1-2-3 manual on airplanes. If you don't know the manual thoroughly, you don't understand what the thing can do."

The other suggestion involves having a spreadsheet planned before you begin building it on the computer. "I usually lay out an involved spreadsheet on paper first," Klingel says. "I diagram the format and the formulas, and then try to figure out how to make the formulas more efficient." Klingel feels this tactic provides an overall perspective that can be lost when building a spreadsheet one cell at a time. As an exercise for novice users, it also helps show the flow of calculations in a worksheet and offers a visual understanding of spreadsheet dynamics.

Beyond the fundamentals of spreadsheet use, the learning continues as you delve into the subtleties.

Jesse Frederick, a consultant to Pacific Bell in San Francisco, uses an IBM Personal Computer to compile cost sheets on several types of Bell-owned or leased telephone equipment. Unlike Klingel, who had a strong accounting background, Frederick's background is in programming.

"I'd never worked with spread-



sheets at all," he says, "but with a programming background I wasn't afraid of reading manuals." While Frederick has used Lotus 1-2-3 for several months, his spreadsheeting days began with about 25 hours using Multiplan. "Multiplan helped me get used to the spreadsheeting concept," he says. "It made it easier to learn Lotus. Complicated packages are more stressful. Because there are more features and more choices to make, you have to learn a lot more to take advantage of the program's capabilities."

Once you've mastered a program, though, there are a lot of rewards. "You understand the sheet's limitations," Frederick says. "Take memory management for example. I used to put columns of colons between columns of numbers, because it looks cleaner when you print it out. But I learned that those columns of colons took up as much memory as if there were large numbers in the cells.

I was making the sheet unnecessarily large because of those columns." Frederick quickly learned to live without the colons.

"As you increase your knowledge," he explains, "you learn to anticipate problems and work around them before they have a chance to cause trouble. Take rounding of numbers for example. If we do a cost sheet and have the numbers rounded to four places instead of two places, we could be off in the column total because of the way the rounding was done. The totals would *look* plausible, but they wouldn't be accurate."

The same goes for building formulas. "I've learned to write them to protect against a lack of information," Frederick says. "If the result of one calculation is zero, and the next calculation tries to divide by zero, you get an error. If there are other calculations that are dependent on *that* calculation, you'll have errors in them, too. You can contaminate the whole sheet with errors. If you know that might happen, you can build the formula with a conditional statement that tells it not to divide if the number is zero."

Frederick's experience with interdependent calculations points to another spreadsheeting concept that can only be mastered with practice: relative as opposed to absolute formulas. Novice spreadsheet users tend to build absolute formulas—those that refer to cells specifically, such as R6C1 + R7C1 (in Multiplan). Absolute formulas are fine in situations where you only need that kind of calculation once. However, a spreadsheet frequently uses similar calculations in more than one column or row. Suppose you were doing a quarterly budget and you wanted column totals for each quarter (which were derived from the sum of values in Rows 6 and 7) to appear in Row 8 of each column. In Column 1 for the first quarter, the formula you would enter in Row 8, Column 1 would be R6C1 + R7C1. To recreate es-

essentially the same calculation to deliver sums of Rows 6 and 7 in Columns 2, 3, and 4, you would either rewrite the formula completely in each column, or copy it to each new column and then edit the cell numbers to reflect the new column locations. Either way, you'd end up with a different formula in each column performing the same operation: R6C1 + R7C1 in column one would become R6C2 + R7C2 in Column 2, and so on.

A far faster method is to use a relative formula for the column total. The relative formula refers to rows and columns in relation to the row and column where the formula resides, so the values calculated will depend on where the formula is executing. The absolute formulas above could be replaced by R[-2C + R]-1C. This formula would always return the sum of Rows 6 and 7 to Row 8 regardless of the column you put it in, because it tells the worksheet to sum the values in the two rows directly above, which is what you want in this case. For a number of repetitive formulas, it is far easier to build such a formula once and copy it in whichever cell you want it then it is to rebuild an absolute formula every time.

Frederick insists that the only way to spreadsheet mastery is hard work. "You just keep hacking away," he says, "trying to think of better ways to do things. A lot of people don't realize that that's all technical people are doing—they just hack away, too."

Klingel offers similar advice. "Superficial users tend to never use the more sophisticated commands, because they won't spend the time," he says. "I designed a personal accounting program where I post expenses to account numbers. Travel, for example, is account number 12. When I'm doing my checkbook register in VisiCalc, I'll enter a travel expense with the number 12, and the program will automatically post it to the correct account. It's really very

simple programming—you use the @if statement in VisiCalc—but it takes some time to learn how to do it. Time and again I've found that you have to force yourself over hurdles.

"Some of it can be very frustrating," Klingel admits. "I spent four hours one night just trying to get the printer to work right with Lotus," he says. "But because of VisiCalc, I've basically paid off both my computers with the income they've generated for me."

For constant and various spreadsheet applications, Klingel's "from the bottom up" learning approach is a good one to follow. It provides flexibility. But thousands of potential spreadsheet users bought their software for a specific application. They don't consider it worth the trouble to spend hours practicing every nuance of the program when they'll only use a few of them. For people like this, there's hope of a different kind, but it requires some trade-offs.

Greg Leib is a vice-president at the brokerage firm of L.F. Rothschild, Unterberg and Towbin in San Francisco. He's been using VisiCalc for about 18 months on Apple II Plus and Apple IIe computers, but he doesn't consider himself a power user. Nevertheless, that doesn't stop him from getting a lot out of the program.

"I wanted to set up a series of worksheets as a screening device for companies I'm tracking," he says. "I've built up a list of about 700 companies over the past ten years or so, and I wanted something where I could store and update company data—assets, liabilities, revenues, and so on—and then be able to analyze it for the company's potential as an investment."

Leib bought a copy of VisiCalc and spent a few hours learning the basic formulas and operation at home. "I realized it wasn't that difficult conceptually," he says, "but I felt I could set up my application a lot quicker if I allied myself with somebody who

was already very familiar with VisiCalc. To me, the mental work was figuring out where I wanted to go, rather than learning the formulas to get there."

During the next few months, Leib worked with a friend who was a power VisiCalc user. "I would put row and column labels on a VisiCalc worksheet and enter the initial values," Leib says, "and then he would work out the formulas." Even with somebody else to do the formula building, it took four months to get the application up and running. "When I first started setting it up," he says, "I really didn't know how I wanted to screen each company. I decided that before getting into a larger, more complex screening device, I wanted to make sure the initial ones made a lot of sense, so I didn't rush things."

The model now combines 30 to 40 different types of financial information on each company Leib tracks and evaluates them on eight different criteria. He's enhancing the model, with his friend's help, so it will evaluate a company on 32 different conditions.

Leib is aware of the trade-off in having somebody else build his models, but feels it's the right one for his situation. "I would love to know more about using the spreadsheet," he says. "I love learning programs. But you realize it's a waste of your efforts. If you're out to make a living in another way, you should concentrate on that."

Learning aids

If you're not lucky enough to have a friend who's a whiz at worksheets, you may want to look around for some help in the form of a software tutorial or class to brush up your skills. One of the major firms supplying software tutorials for popular spreadsheet programs is Cdex Corp. in Los Altos, California. Mary Humphrey, a senior instructional designer at Cdex, suggests that a couple

of hours spent with a software tutorial or in a class could solidify a shaky foundation of basic knowledge, as well as clear up specific problems.

While it can take from four to six hours to complete an entire Cdex course, Humphrey says, somebody who's already using a spreadsheet can browse through a tutorial and focus on their weak areas in an hour or two. For users who want to improve their understanding but don't necessarily want to spend weeks mastering every nuance of a program, this can be the way to go.

If you prefer the human touch, there are several options, explains David Ferris, chairman of Ferrin Corp., a personal computing support firm for end users and data processing departments in large corporations. "Users can get rudimentary training from a computer store, or they can get various kinds of training from training firms, consultants, or even the corporate training center." Ferris's company conducts classes through corporate training departments at firms like the Bank of America. The classes offer different levels of instruction, from basic spreadsheet concepts to introductory instruction in a specific program, to advanced spreadsheeting techniques.

But taking a class, Ferris notes, is not a panacea. "Sometimes a person just needs advice," he says. "They might be thinking of using a spreadsheet for an application that could be done better with a data base program for example." Of course, a thorough knowledge of a spreadsheet's capabilities would avoid this kind of mistake.

The payoff

Still, there is a lot to be gained from any efforts to improve spreadsheet skills if you have the time and imagination. The immediate payoff is the ability to design and build spreadsheets more quickly, and with fewer manual-thumbing digressions.

Joe Shelton is a software marketing manager at Apple Computer

who's been using electronic spreadsheets since 1979. Once he mastered VisiCalc, he says, "I built models for just about everything. I started off doing marketing studies for Apple and now I've got about 120 different VisiCalc models stored on disk. When I have anything that could benefit from being analyzed on a worksheet, I do a model. When I was



A few hours spent with a software tutorial or in a class could solidify a shaky foundation of knowledge.

going to get a personal loan, for example, and wanted to look at borrowing different amounts for different periods at different rates, I did a loan amortization model. I also have an income analysis model. I even did one for analyzing tennis matches—I put the set scores into it and look for patterns to identify weaknesses in my game."

More than a few times, Shelton's modeling has paid off materially. "I'm a pilot," he says, "and I used to rent the biggest, fastest plane I thought I needed to fly somewhere. Now I have a weight/economy analysis model. I enter the weight of the passengers and baggage, the distance I'm going to fly, the amount of time I have to get there, and other information. I can make a decision about the most economical plane to rent that satisfies those requirements. I usually end up with a less expensive plane

Having spreadsheet power at his

command has taught Shelton to be more analytical. Klingel calls it "thinking like a spreadsheet."

"I tend to automatically think of problems more in terms of models, rather than guesses," Klingel says. "If I have to estimate the amount of money to reserve for bad debts at a certain level of advertising sales, for example, I think in terms of a model that will allow me to test various scenarios. In the past, I would have guessed a certain percentage and left it at that." Guesswork, by its very nature, tends to force generalized approaches to problems—because you're doing it in your head or with a pencil and paper, it's almost impossible to take all the potential variables of a problem into consideration.

Of course, you can't use a spreadsheet to decide what to order for lunch, and there will be problems where the quality of the solution really doesn't merit the time it would take to construct a model to analyze it, but having the skill at your disposal will be worth it. "There are always things you could do with a spreadsheet that you don't, because they take too much time compared with the value of the result," Shelton says. "But for every person who isn't doing something they *could* do with a spreadsheet, there are probably 10 or 15 people doing things they never could without it."

In the end it comes down to flexibility, the kind of flexibility that makes spreadsheets so powerful and so difficult to master. You don't—and won't—use a spreadsheet for everything you do, and it might not be immediately apparent how your improved knowledge will help you. But knowing how to make such a tool do your bidding, quickly and efficiently, can be a powerful addition to your skills. It might mean investing a few hours, but if it gives you the option of doing sophisticated analyses that you would formerly have been forced to rule out, becoming a power spreadsheeter could well be worth it.

HOW TO PICK A PRINTER:

(A survivor's guide.)



WRITE DOWN WHAT YOU NEED ONE FOR IN THE FIRST PLACE.

And then the second place. And third place (Letters to customers, newsletters, financial reports, etc.). In other words, set down your priorities, in black and white—which will go a long way toward keeping you out of the red. Because the price of a printer is almost directly proportional first to the quality of its printing, and second to how fast it prints.



THERE ARE TWO KINDS OF PRINTERS IN THIS WORLD. CHOOSE ONE.

Either "letter-quality," which gives you text that you can't tell from hand-typed copy... or "dot-matrix," which, with a C. Itoh printer, looks like this. (Most other dot-matrix, or "business printers" have a far flimsier dot pattern, and give you copy that looks like a bad job of spray painting.) The former is for formal: reports to clients, final drafts of boilerplate, contracts, or letters to the President. It prints with easily available "daisy wheels," similar to those on many typewriters. It's the "show" part of Show and Tell and its price reflects it.

Letter-quality printers generally cost about a grand more than their dot-matrix counterpart. Dot-matrix printers are made for the "tell" functions: things like financial data, interoffice memos, authors' first drafts, or "dumping" a bunch of programming data onto hard copy for reference or de-bugging. Not fancy, but functional. And, comparatively, cheap.



FIGURE OUT HOW FAST YOU NEED WHAT.

Because the higher the speed, the higher the price—typically several hundred bucks per significant speed jump. (About speed: It's measured in "cps," or "characters per second.") A standard business letter contains about 1,000 characters. So, at 18 cps, it takes about a page per minute to print. Therefore, you have to ask yourself if it's worth an extra \$500 to double the speed with another letter-quality printer. If you churn out lots of copy, the answer is probably yes; if you grind out only a dozen letters a day, it's probably no.



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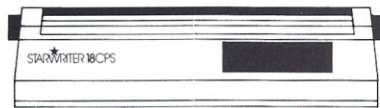
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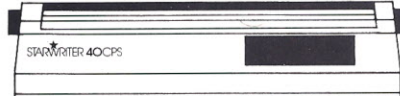
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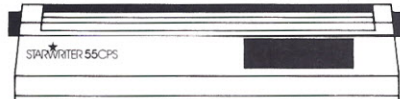
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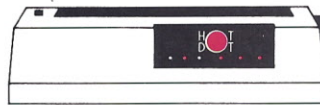
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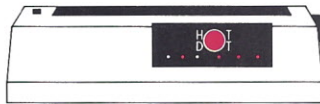
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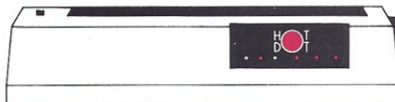
180 CPS DOT-MATRIX PRINTER



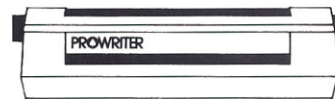
WIDE-CARRIAGE 180 CPS DOT-MATRIX PRINTER



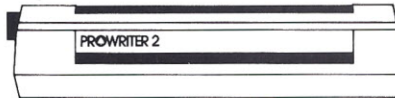
180 CPS COLOR DOT-MATRIX PRINTER



WIDE-CARRIAGE 180 CPS COLOR DOT-MATRIX PRINTER



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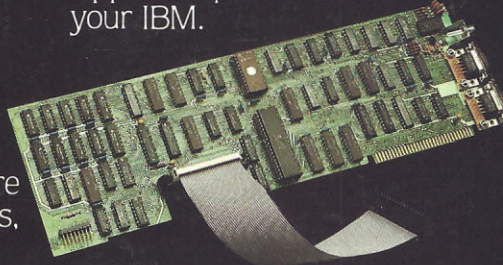
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